



# OPERATOR'S MANUAL



## Landlord DLX Series

### 17HP Liquid Cool Hydro Tractors

Mfg. No.	Description
1693379	Landlord DLX, 17HP LC Hydro
1693387	Landlord DLX, 17HP LC Hydro (Export)

### 44" Mower Decks

Mfg. No.	Description
1692686	44" Mower Deck
1693172	44" Mower Deck (Export)

### 18HP Hydro Tractors

Mfg. No.	Description
1693381	Landlord DLX, 18HP Hydro
1693389	Landlord DLX, 18HP Hydro (Export)
1693806	Landlord DLX, 18HP Hydro
1693807	Landlord DLX, 18HP Hydro (Export)
1693895	Landlord DLX, 18HP Hydro
1693898	Landlord DLX, 18HP Hydro (Export)

### 50" Mower Decks

Mfg. No.	Description
1692688	50" Mower Deck
1692881	50" Mower Deck (LC & Export)

### 20HP Hydro Tractors

Mfg. No.	Description
1693383	Landlord DLX, 20HP Hydro
1693391	Landlord DLX, 20HP Hydro (Export)

### 54" Mower Decks

Mfg. No.	Description
1693629	54" Mower Deck
1693727	54" Mower Deck (Export)

### 23HP Hydro Tractors

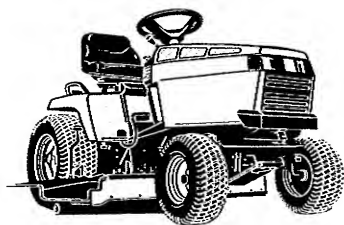
Mfg. No.	Description
1693804	Landlord DLX, 23HP Hydro
1693805	Landlord DLX, 23HP Hydro (Export)

1719693-10

Rev 6/2001

TP 100-2224-10-LL-SMA





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*NOTE: In this manual, "left" and "right" are referred to as seen from the operating position.*



## WARNING

Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.

# Identification Numbers

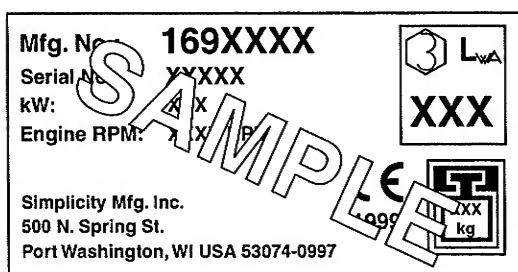


## IDENTIFICATION TAG LOCATIONS

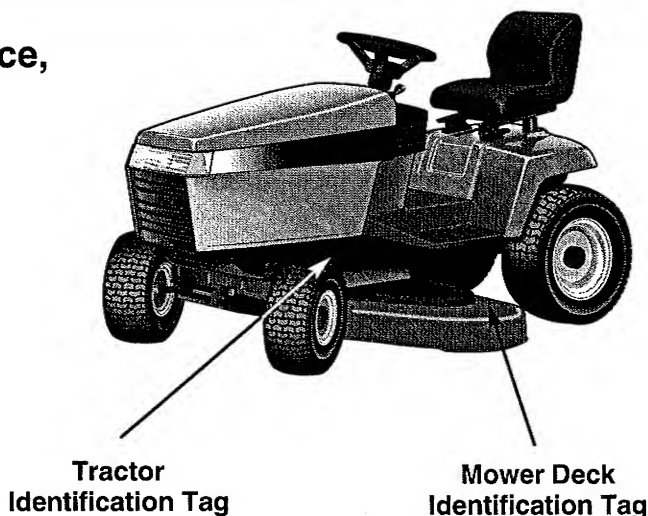
When contacting your Authorized Dealer for replacement parts, service, or information **YOU MUST HAVE THESE NUMBERS.**



### NORTH AMERICAN MODELS



### CE MODELS



## IDENTIFICATION NUMBERS

Record your model name/number, unit and mower deck manufacturer numbers and engine serial number in the space provided for easy reference.

- The **Tractor I.D. tag** is located on the left-side, of the frame, as shown below.
- The **Mower Deck I.D. tag** is also on the left side, on top of the mower deck.
- For location of **Engine Serial Number**, refer to the Engine Owner's Manual.

Be sure to fill out and return the Warranty Registration Card supplied with your unit.

PRODUCT REFERENCE DATA	
Model Description Name/Number	
Tractor MFG Number	Tractor SERIAL Number
Mower Deck MFG Number	Mower Deck SERIAL Number
Dealer Name	Date Purchased
ENGINE REFERENCE DATA	
Engine Make	Engine Model
Engine Type/Spec	Engine Code/Serial Number




# Safety Rules & Information



Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of unit, severe personal injury or death to you, or bystanders, or damage to property or equipment.

**This mowing deck is capable of amputating hands and feet and throwing objects.**

The triangle  in text signifies important cautions or warnings which must be followed.

## GENERAL OPERATION

- Read, understand, and follow all instructions in the manual and on the unit before starting.
- Only allow responsible adults, who are familiar with the instructions, to operate the unit (local regulations can restrict operator age).
- Clear the area of objects such as rocks, toys, wire, etc., which could be picked up and thrown by the blade(s).
- Be sure the area is clear of other people before mowing. Stop unit if anyone enters the area.
- Never carry passengers.
- Do not mow in reverse unless absolutely necessary. Always look down and behind before and while travelling in reverse.
- Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the deflector in place.
- Slow down before turning.
- Never leave a running unit unattended. Always disengage the PTO, set parking brake, stop engine, and remove keys before dismounting.
- Turn off the PTO switch to disengage the blades when not mowing.
- Stop engine before removing grass catcher or unclogging chute.
- Mow only in daylight or good artificial light.
- Do not operate the unit while under the influence of alcohol or drugs.
- Watch for traffic when operating near or crossing roadways.
- Use extra care when loading or unloading the unit into a trailer or truck.
- Data indicates that operators, age 60 years and above, are involved in a large percentage of riding mower-related injuries. These operators should evaluate their ability to operate the riding mower safely enough to protect themselves and others from injury.
- Keep in mind the operator is responsible for accidents occurring to other people or property.
- All drivers should seek and obtain professional and practical instruction.
- Always wear substantial footwear and trousers. Never operate when barefoot or wearing sandals.
- Before using, always visually check that the blades and blade hardware are present, in-tact, and secure. Replace worn or damaged parts.
- Never operate the machine with defective guards, or without safety protective devices in place.
- Disengage attachments before: refuelling, removing an attachment, making adjustments (unless the adjustment can be made from the operator's position).
- When the machine is parked, stored, or left unattended, lower the cutting means unless a positive mechanical lock is used.
- Follow the manufacturer's recommendation for wheel weights or counterweights.

## SLOPE OPERATION



### WARNING

Never operate on slopes greater than 17.6 percent (10°) which is a rise of 3-1/2 feet (106 cm) vertically in 20 feet (607 cm) horizontally.

When operating on slopes use additional wheel weights or counterweights. See your dealer to determine which weights are available and appropriate for your unit.

Select slow ground speed before driving onto slope. In addition to front and rear weights, use extra caution when operating on slopes with rear-mounted grass catcher.

Mow UP and DOWN the slope, never across the face, use caution when changing directions and **DO NOT START OR STOP ON SLOPE.**

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not operate on it.

Control of a ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are: insufficient tire grip on the ground, speed too fast, inadequate braking, the type of machine is unsuitable for its task, lack of awareness of the ground conditions, incorrect hitching and load distribution.

### Do

- See your authorized dealer for recommendations of wheel weights or counterweights to improve stability.
- Mow up and down slopes, not across.
- Remove obstacles such as rocks, tree limbs, etc.
- Watch for holes, ruts, or bumps. Uneven terrain could overturn the unit. Tall grass can hide obstacles.
- Use slow speed. Tires may lose traction on slopes even through the brakes are functioning properly. Choose a low gear so that you will not have to stop or shift while on the slope.
- Use extra care with grass catchers or other attachments. These can change the stability of the unit.
- Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.
- Always keep unit in gear especially when traveling downhill. When clutching, release clutch slowly.

### Do Not

- Do not start or stop on a slope. If tires lose traction, disengage the blade(s) and proceed slowly straight down the slope.
- Do not turn on slopes unless necessary, and then, turn slowly and gradually downhill, if possible.
- Do not mow near drop-offs, ditches, or embankments. The mower could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Do not mow on wet grass. Reduced traction could cause sliding.
- Do not try to stabilize the unit by putting your foot on the ground.
- Do not use grass catchers on steep slopes.
- Do not mow slopes you cannot back up.
- Do not shift to neutral and coast down hill.

# Safety Rules

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## Slope Operation Continued Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the unit and the mowing activity. Never assume that children will remain where you last saw them.

- Keep children out of the mowing area and under the watchful care of another responsible adult.
- Be alert and turn unit off if children enter the area.
- Before and during reverse operation, look behind and down for small children.
- Never carry children. They may fall off and be seriously injured or interfere with safe unit operation.
- Never allow children to operate the unit.
- Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

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## TOWING

- Never allow children or others in or on towed equipment.
- Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the hitch point.
- Follow the manufacturer's recommendations for weight limit for towed equipment and towing on slopes.
- On slopes, the weight of the towed equipment may cause loss of traction and loss of control.
- Travel slowly and allow extra distance to stop.
- Do not shift to neutral and coast down hill.

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## SERVICE AND MAINTENANCE

- Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.
  - a) Use only an approved container.
  - b) Never remove gas cap or add fuel with the engine running. Allow engine to cool before refueling. Do not smoke.
  - c) Never refuel the unit indoors.
- If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
- Replace all fuel tank caps and fuel container caps securely.
- Never fill containers inside a vehicle or on a truck bed with a plastic bed liner. Always place containers on the ground away from your vehicle before filling.
- Remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
- Keep nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
- If fuel is spilled on clothing, change clothing immediately.
- Maintain or replace safety and instruction labels as necessary.
- Never run a unit in an enclosed area.
- Keep nuts and bolts, especially blade attachment bolts, tight and keep equipment in good condition.
- Never tamper with safety devices. Check their proper operation regularly and make necessary repairs if they are not functioning properly.
- Keep unit free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage.
- Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.

## TRANSPORTING AND STORAGE

### WARNING

When transporting this tractor on an open trailer, make sure unit is facing forward, toward the direction of travel. If tractor is facing backward, wind lift could cause damage to the hood.

- Always observe safe refueling and fuel handling practices when refueling the tractor after transportation or storage.
- Always follow the engine manual instructions for storage preparations before storing the tractor for both short and long term periods.
- Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.
- Never store the unit or fuel container inside where there is an open flame or pilot light, such as in a water heater. Allow unit to cool before storing.

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## EMISSIONS

- Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.
- Look for the relevant Emissions Durability Period and Air Index information on the engine emissions label.

- Never make adjustments or repairs with the engine running unless specified otherwise in the engine manufacturer's manual.
- Grass catcher components are subject to wear, damage, and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
- Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves, and use extra caution when servicing them.
- Check brake operation frequently. Adjust and service as required.
- Use only factory authorized replacement parts when making repairs.
- Always comply with factory specifications on all settings and adjustments.
- Only authorized service locations should be utilized for major service and repair requirements.
- Never attempt to make major repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding of manufacturer's warranty.
- On multiple blade mowers, take care as rotating one blade can cause other blades to rotate.
- Do not change engine governor settings or over-speed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
- Disengage drive attachments, stop the engine, remove the key, and disconnect the spark plug wire(s) before: clearing attachment blockages and chutes, performing service work, striking an object, or if the unit vibrates abnormally. After striking an object, inspect the machine for damage and make repairs before restarting and operating the equipment.
- Never place hands near the hydro pump cooling fan when the tractor is running. Cooling fan is located on top of the transaxle.

## SAFETY DECALS

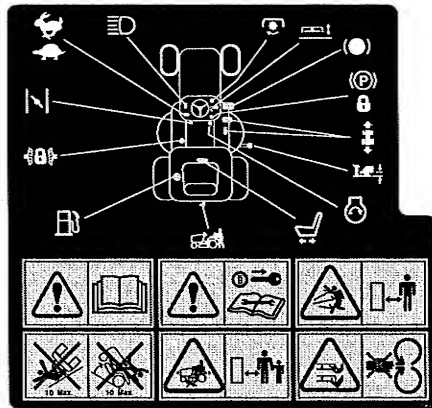
This unit has been designed and manufactured to provide you with the safety and reliability you would expect from an industry leader in outdoor power equipment manufacturing.

Although reading this manual and the safety instructions it contains will provide you with the necessary basic knowledge to operate this equipment safely and effectively, we have placed several safety labels on the unit to remind you of this important information while you are operating your unit.

All DANGER, WARNING, CAUTION and instructional messages on your rider and mower should be carefully read and obeyed. Personal bodily injury can result when these instructions are not followed. The information is for your safety and it is important! The safety decals below are on your rider and mower.

If any of these decals are lost or damaged, replace them at once. See your local dealer for replacements.

These labels are easily applied and will act as a constant visual reminder to you, and others who may use the equipment, to follow the safety instructions necessary for safe, effective operation.



Decal - Operating Instructions, CE Models, Part No. 1722512



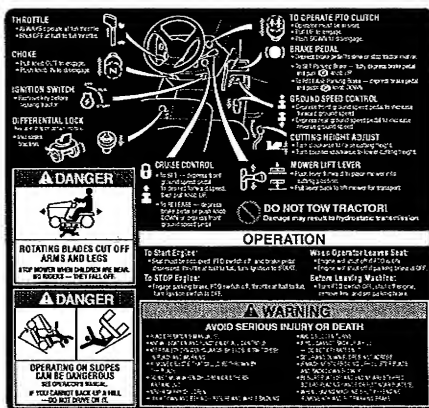
Decal - Danger Part No. 1704276



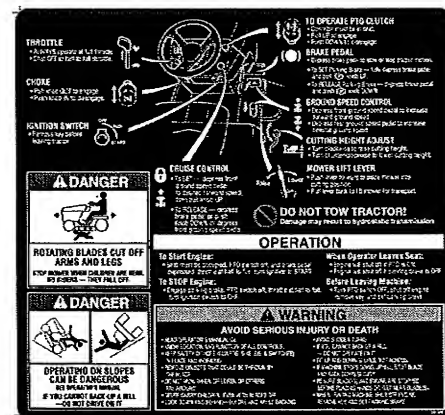
Decal - Danger Part No. 1704277



Decal - Transmission Release Part No. 1719635



Decal - Operating Instructions, North American Models with Hydraulic Lift, Part No. 1719770



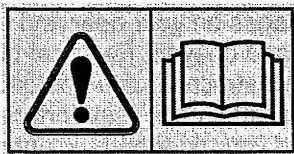
Decal - Operating Instructions, North American Model with Manual Lift, Part No. 1721855



## CE Safety Icons

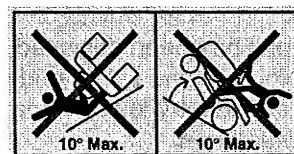
### Warning: Read Operator's Manual.

Read and understand the Operator's Manual before using this machine.



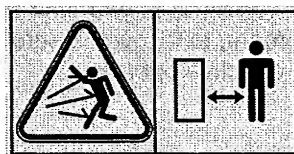
### Danger: Machine Rollover.

Do not use this machine on slopes greater than 10°.



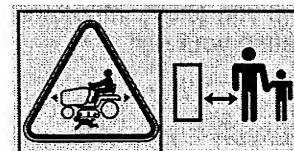
### Danger: Thrown Objects.

This machine is capable of throwing objects and debris. Keep bystanders away.



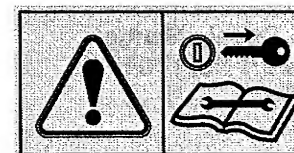
### Danger: Dismemberment.

This machine can amputate limbs. Keep bystanders and children away when engine is running.



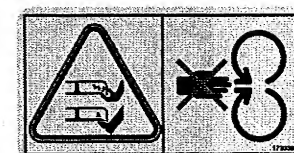
### Warning: Remove Key Before Servicing.

Remove the key and consult technical literature before performing repairs or maintenance.



### Danger: Dismemberment.

This mower deck can amputate limbs. Keep hands and feet away from blades.





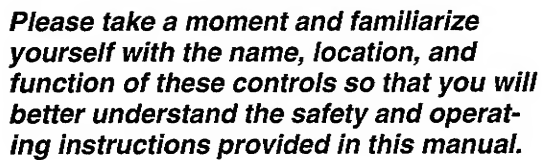
Model	1693380	1693388, 1693386	1693390, 1693392	1693396, 1693398	1693400	1693402	1693856, 1693858	1693837	1693392, 1693404	1693390	1693384, 1693406	1693392	16933810, 1693812, 1693813	1693811	1693877, 1693880	1693878
<b>Vibration Data *</b> At the Steering Wheel (in $m/s^2$ ) At the Seat (in $m/s^2$ )	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
<b>Drawbar Force Limits</b> Horizontal Force Limit (in Newton) Vertical Force Limit (in Newton)	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222	444 222
<b>Sound Pressure Data **</b> LpA (in dB(A))	90	90	90	90	90	90	90	N/A	86	92	90	93	90	94	90	92
<b>Sound Power Data ***</b> LwA (in dB(A))	102	102	105	102	102	105	102	N/A	100	N/A	102	N/A	103	N/A	N/A	102
<b>Standards &amp; Directive Compliance</b> European Harmonized Lawn Mower Standard EN 836	X	X						X		X					X	
European Machinery Directive 98/37/EC		X								X						X
European EMC Directive 89/336/EEC		X						X		X					X	
GS Mark Certified by TUV Rheinland																
ANSI B71.1-1998	X				X	X	X		X		X				X	X

Specifications are correct at the time of printing and subject to change without notice.  
Items marked "N/A" are not available at the time of printing.

\*Tested according to European Normative Vibration Standards EN 1032 & EN 1033.  
Test performed on a concrete floor.

\*\*Tested according to European Noise Directive 79/113/EEC.  
Sound pressure at operator's position.

\*\*\*Tested according to EN 84/538/EEC.



### Figure 1. Tractor and Mower Controls

*The information below briefly describes the function of individual controls. Starting, stopping, driving, and mowing require the combined use of several controls applied in specific sequences. To learn what combination and sequence of controls to use for various tasks see the OPERATION section.*



The throttle controls engine speed. Move the throttle forward to increase engine speed and back to decrease engine speed. Always operate at FULL throttle.



The PTO (Power Take-Off) switch engages and disengages attachments that use the front PTO. To engage the PTO, pull UP on the switch. Push DOWN to disengage. *Note that the operator must be seated firmly in the tractor seat for the PTO to function.*



### Attachment Lift Control Lever

The attachment lift control lever raises and lowers attachments that utilize the tractor's hydraulic lift cylinder or manual lift linkage. Pushing the lever forward lowers the attachment while pulling the lever back raises the attachment (NOTE: On models with manual lift, you must pull back slightly on the lever and depress the release button to change lift positions).

**IMPORTANT NOTE - Hydraulic Lift Models:** The tractor's hydraulic system charge pump is part of the transmission and is powered by the transmission drive belt. Therefore the attachment lift will not work when the parking brake is engaged.

When using the mower deck, lift the deck off the ground while transporting to and from the job site. **DO NOT** cut with the mower in the raised, transport position.

**NOTE - Manual Lift Models:** Be sure the lift lever is fully forward when mowing.



### Parking Brake / Cruise Control

The parking brake / cruise control knob is used to lock the parking brake when the tractor is stopped AND to lock the cruise control when the tractor is in motion.

Fully depressing the brake pedal and pulling up on the knob engages the parking brake.

Pulling up on the knob while depressing the forward ground speed pedal engages the cruise control.

Refer to page 8 for a full explanation of parking brake / cruise control functions.



### Ground Speed Pedals

The tractor's forward ground speed is controlled by the forward ground speed control pedal. The tractor's reverse ground speed is controlled by the reverse ground speed control pedal.

Depressing either pedal will increase ground speed. Note that the further down the pedal is depressed, the faster the tractor will travel.



### Ignition Switch

The ignition switch starts and stops the engine, it has three positions:

- OFF Stops the engine and shuts off the electrical system.
- RUN Allows the engine to run and powers the electrical system.
- START Cranks the engine for starting.

**NOTE:** Never leave the ignition switch in the RUN position with the engine stopped—this drains the battery.



### Brake Pedal

Depressing the brake pedal applies the tractor brake.



### Mower Height of Cut Adjustment

The cutting height adjustment knob controls the mower cutting height. The cutting height is infinitely adjustable between 1" and 3-5/8."



### Seat Adjustment Lever

The seat can be adjusted forward and back. Move the lever, position the seat as desired, and release the lever to lock the seat into position.



### Transmission Oil Expansion Chamber

The oil is added through the transmission oil expansion chamber. It also serves as extra holding capacity for oil as the transmission heats up and the oil expands. See TRANSMISSION MAINTENANCE for oil level check and fill procedures.



### Transmission Release Valve Lever

The transmission release valve lever deactivates the transmission so that the tractor can be pushed by hand. See PUSHING THE TRACTOR BY HAND for operational information.



### Fuel Tank

To remove the cap, turn counterclockwise.



### Differential Lock Pedal (Select Models)

Depressing this pedal locks the transmission differential, locking both rear wheels into "drive".

Use this feature if the tractor is stuck because one wheel is slipping. **Engage the differential lock at slow ground speeds only.**

### Gas Gauge (Not Pictured)

The gas gauge is located in the front panel of the seat deck to the left of the seat. The amount of fuel shown in the gage tube directly corresponds to the amount of fuel in the tank; i.e. the higher the level shown in the gage, the higher the level in the tank.

### Gauge Wheels (54" Models, Not Pictured)

The mower gauge wheels can be placed in two positions depending on the height of cut. When using higher cutting heights, set the wheels in the lower position. When using lower cutting heights, set the wheels in the upper position. See the Adjustments section for gauge wheel adjustment.

## Features & Controls

### PARKING BRAKE / CRUISE CONTROL KNOB FUNCTIONS

**Applying the Parking Brake** - See Figure 2. To lock the parking brake, release the ground speed pedals (A), fully depress the brake pedal (B), pull UP on the parking brake / cruise control knob (C), and then release brake pedal.

**Releasing the Parking Brake** - See Figure 2. To release the parking brake, fully depress the brake pedal (B) and push the parking brake / cruise control knob (C) DOWN.

**Applying the Cruise Control** - See Figure 3. To apply the cruise control, depress the forward ground speed pedal (A) until the desired speed is achieved. Then pull up on the parking brake / cruise control knob (C) and release the forward ground speed pedal (A).

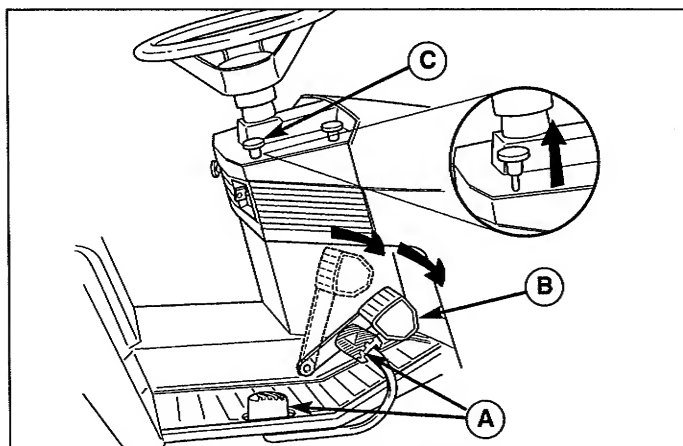
**Releasing the Cruise Control** - See Figure 3. The cruise control can be released three ways:

1. Tap the forward ground speed pedal (A).
2. Push the parking brake / cruise control knob (C) DOWN.
3. Depress the brake pedal (B).

**In the event you need to stop quickly, fully depressing the brake pedal (B) will automatically release the cruise control and stop the tractor.**

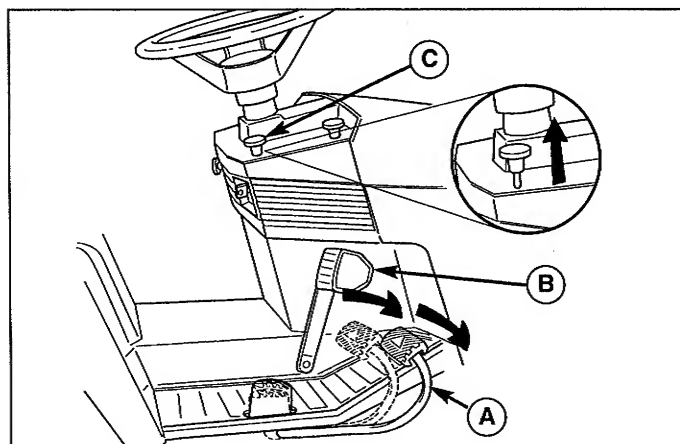
For normal operation, it is recommended that you manually disengage the cruise control by tapping the forward ground speed pedal or pushing the parking brake / cruise control knob down.

**IMPORTANT NOTE:** The tractor's hydraulic system charge pump is part of the transmission and is powered by the transmission drive belt. Therefore the attachment lift will not work when the parking brake is engaged.



**Figure 2. Engaging the Parking Brake**

- A. Ground Speed Pedals
- B. Brake Pedal
- C. Parking Brake / Cruise Control Knob



**Figure 3. Cruise Control Function**

- A. Forward Ground Speed Pedal
- B. Brake Pedal
- C. Parking Brake / Cruise Control Knob

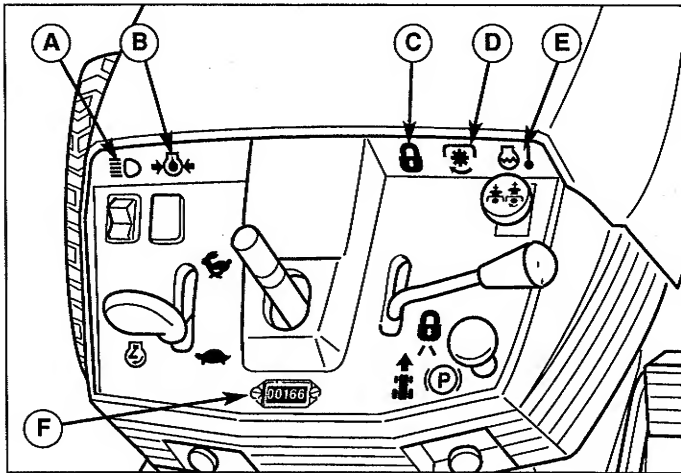


Figure 4. Dashboard Display

## DASHBOARD DISPLAY FUNCTIONS

Refer to Figure 4.

### A. Headlight Indicator Light

Indicates that the headlights are on.

### B. Low Oil Pressure Light

Indicates that the engine oil pressure is low. **IF THIS LIGHT TURNS ON WHILE THE TRACTOR IS IN USE, TURN THE ENGINE OFF IMMEDIATELY. Contact your authorized dealer for service.**

### C. Parking Brake / Cruise Control Light

Indicates that the parking brake or cruise control is engaged.

### D. PTO Light

Indicates the PTO switch is in the ON position.

### E. Engine Coolant Temperature Light (Liquid Cooled Models Only)

Flashes when the engine is overheating. The light will turn on when the tractor is first started and then go out. **IF THIS LIGHT FLASHES WHILE THE TRACTOR IS IN USE, TURN THE ENGINE OFF IMMEDIATELY.** Allow the engine to cool, check the coolant level, and clean the radiator and screens.

### F. Hour Meter

Shows the number of hours the key switch has been in the ON position.



## SAFETY INTERLOCK SYSTEM TESTS

This unit is equipped with safety interlock switches and other safety devices. These safety systems are present for your safety: do not attempt to bypass safety switches, and never tamper with safety devices. Check their operation regularly.

### Operational SAFETY Checks

Your unit is equipped with a seat switch safety system. Check the seat switch operation every fall and spring with the following tests.

#### Test 1 — Engine should NOT crank if:

- PTO switch is ON, OR
- Brake pedal is NOT fully depressed (parking brake OFF).

#### Test 2 — Engine SHOULD crank if:

- PTO switch is OFF, AND
- Brake pedal is fully depressed (parking brake ON).

#### Test 3 — Engine should SHUT OFF if:

- Operator rises off seat with PTO engaged, OR
- Operator rises off seat with brake pedal NOT fully depressed (parking brake OFF).

#### Test 4 — Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within five seconds after electric PTO switch is turned OFF (or operator rises off seat). If mower drive belt does not stop within five seconds, readjust the PTO clutch as described in the ADJUSTMENTS section or see your dealer.

*NOTE: Once the engine has stopped, the PTO switch must be turned off after the operator returns to the seat in order to start the engine.*



## WARNING

**If the unit does not pass a safety test, do not operate it. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety interlock system.**

# Operating the Tractor



## ⚠ WARNING

If you do not understand how a specific control functions, or have not yet thoroughly read the **FEATURES & CONTROLS** section, do so now.

Do NOT attempt to operate the tractor without first becoming familiar with the location and function of ALL controls.



## GENERAL OPERATING SAFETY

Before first time operation:

- Be sure to read all information in the Safety and Operation sections before attempting to operate this tractor and mower.
- Become familiar with all of the controls and how to stop the unit.
- Drive in an open area without mowing to become accustomed to the unit.

## CHECKS BEFORE STARTING

- Check that the crankcase is filled with oil to full mark on dipstick. See the engine Operator's Manual for instructions and oil recommendations. See Figure 5 for hood access.
- Make sure all nuts, bolts, screws and pins are in place and tight.
- Adjust the seat position, and make certain you can reach all controls from operator's position.
- Fill the gasoline tank with fresh gasoline. Refer to engine manual for gasoline recommendations.
- Make certain rear counterweights are installed if you will be operating the unit on sloping ground.

## ⚠ WARNING

Never allow passengers to ride on the unit.

Before leaving the operator's position for any reason, engage the parking brake, disengage the PTO, stop the engine and remove the key.

To reduce fire hazard, keep the engine, tractor and mower free of grass, leaves and excess grease. Do not stop or park tractor over dry leaves, grass or combustible materials.

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

## ⚠ WARNING

Never operate on slopes greater than 17.6 percent (10°) which is a rise of 3-1/2 feet (106 cm) vertically in 20 feet (607 cm) horizontally.

When operating on slopes use additional wheel weights or counterweights. See your dealer to determine which weights are available and appropriate for your unit.

Select slow ground speed before driving onto slope. In addition to front and rear weights, use extra caution when operating on slopes with rear-mounted grass catcher.

**Mow UP and DOWN the slope, never across the face, use caution when changing directions and DO NOT START OR STOP ON SLOPE.**

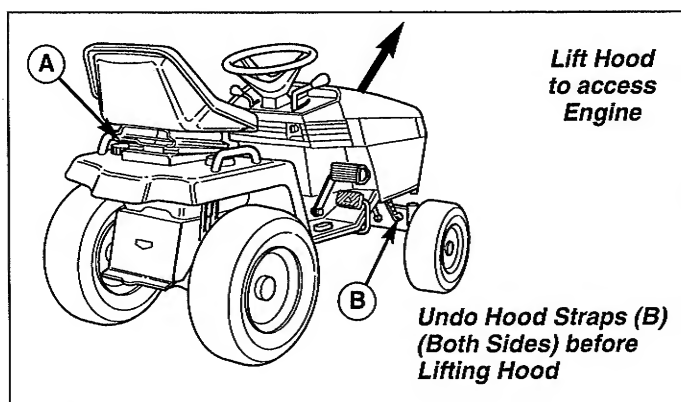


Figure 5. Engine Access

- A. Fuel Tank
- B. Hood Straps

## STARTING THE ENGINE

1. While sitting in the operator's seat, fully depress the brake pedal or set the parking brake.
  2. Make sure that your feet are not depressing the ground speed control pedals.
  3. Disengage the PTO clutch.
  4. Set the throttle to FULL.
  5. Pull the Choke knob OUT to choke the engine.
- NOTE: A warm engine may not require choking.*
6. Insert the ignition key and turn it to START.
  7. After the engine starts, move the engine throttle control to SLOW. Warm up the engine by running it for at least a minute before engaging the PTO switch or driving the tractor.

*NOTE: In the event of an emergency the engine can be stopped by simply turning the ignition switch to STOP. Use this method only in emergency situations. For normal engine shut down follow the procedure given in STOPPING THE TRACTOR.*

## STOPPING THE TRACTOR & ENGINE

1. Disengaging the cruise control and taking your foot off the ground speed control pedals will stop tractor movement. For emergency stopping depress the clutch / brake pedal.
2. Engage the parking brake.
3. Disengage the PTO.

### Kohler Models:

4. Position the throttle control at idle.
5. Turn the ignition switch to STOP. Remove the key.

### Briggs & Stratton and Kawasaki Models:

4. Position the throttle control at idle and run for about one minute.
5. Turn the ignition switch to STOP. Remove the key.

## DRIVING THE TRACTOR

1. Sit in the seat and adjust the seat so that you can comfortably reach all the controls and see the dash-board display.
2. Engage the parking brake.
3. Make sure the PTO switch is disengaged.
4. Start the engine (see STARTING THE ENGINE).
5. Disengage the parking brake and release the brake pedal.
6. Depress the forward ground speed control pedal to travel forward. Release the pedal to stop. Note that the further down the pedal is depressed the faster the tractor will travel.
7. Stop the tractor by releasing the ground speed control pedals, setting the parking brake, and stopping the engine (see STOPPING THE TRACTOR AND ENGINE).

## MOWING

1. Engage the parking brake. Make sure the PTO switch is disengaged.
2. Start the engine (see STARTING THE ENGINE).
3. Fully lower the mower using the attachment lift lever.
4. Set the mower cutting height to the desired level and set the gauge wheels to the appropriate position.
5. Set the throttle to FULL.
6. Engage the PTO (Mower Deck).
7. Begin mowing. See Section C for tips on mowing patterns, lawn care, and troubleshooting information.
8. When finished, shut off the PTO and raise the mower using the attachment lift control lever.
9. Stop the engine (see STOPPING THE TRACTOR AND ENGINE).

## PUSHING THE TRACTOR BY HAND

1. Disengage the PTO and turn the engine off.
2. Move the transmission release lever up, pull back approximately 1" (2.5cm), and press down to lock into released position (Figure 6).
3. The tractor can now be pushed by hand.



### DO NOT TOW TRACTOR

Towing the unit will cause transmission damage. • Do not use another vehicle to push or pull this unit. • Do not actuate the transmission release valve lever while the engine is running.

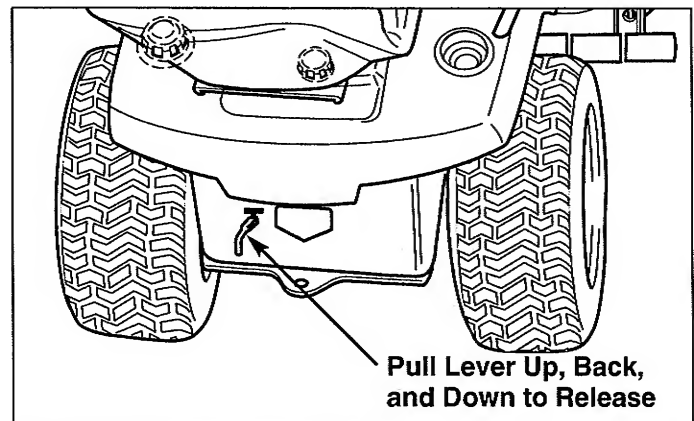
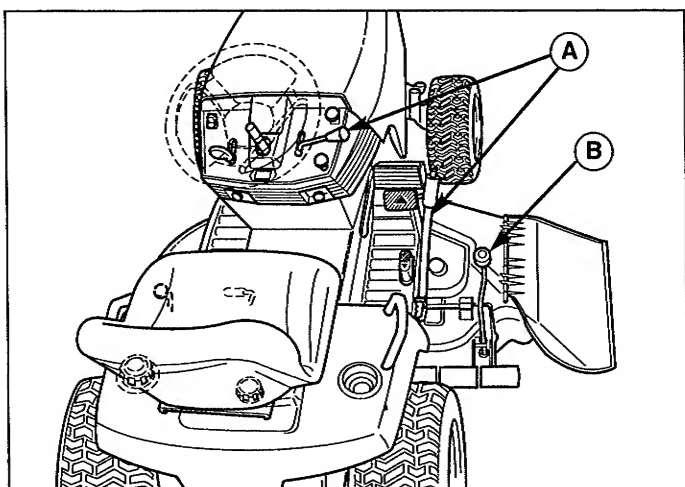


Figure 6. Transmission Release Lever



# Operating the Tractor



**Figure 7. Raising & Lowering Mower**

- A. Mower Lift Lever
- B. Mower Height Adjuster

## MOWER DECK REMOVAL & INSTALLATION

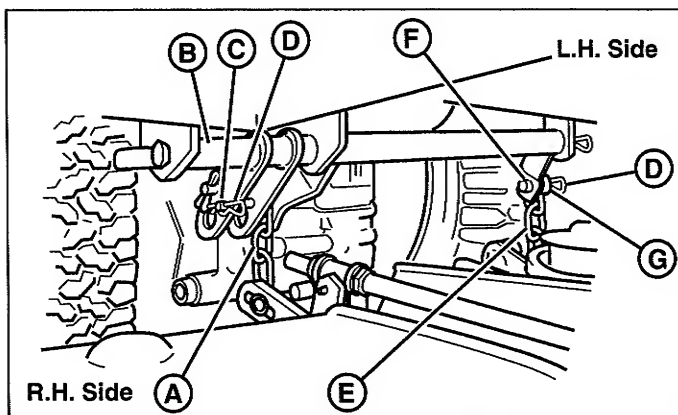
### ⚠ WARNING

Engage parking brake, disengage PTO, stop engine and remove key before attempting to install or remove the mower.

Muffler and surrounding areas may be hot.

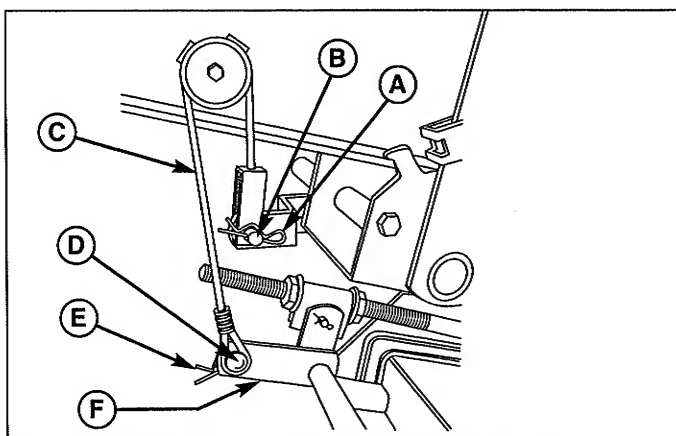
### Removing the Mower Deck - 44" & 50" Models

1. Park the tractor, fully lower the attachment lift, turn off the PTO, turn off the engine, remove the key, and engage the parking brake.
2. Place mower in the lowest cutting position using the mower height adjuster (B, Figure 7).
3. **44" Models & Hydraulic Lift Models:** Disconnect the mower lift chains (A, E, Figure 8) from the tractor lift arm (B). Re-install clevis pins, washers and safety clips on mower lift arms for storage.
- 50" Manual Lift Models:** Disconnect the mower lift cables (C, Figure 9) from the mower lift arms (F). Re-install the clevis pins, washers and hairpin clips for storage.
4. Remove belt from PTO pulley (B, Figure 10).
5. Turn wheels straight ahead. Pull back on spring-loaded lever (B, Figure 11) and lift mower hitch off of the tractor brackets (A).
6. Turn wheels fully left, and slide mower deck out from under the right side of the tractor.



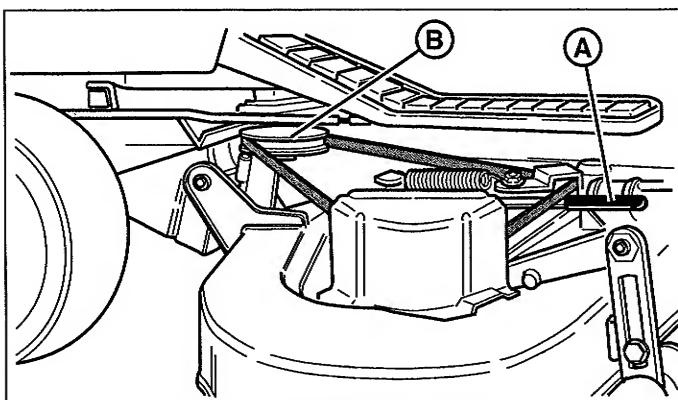
**Figure 8. Mower Lift - Hydraulic Lift Models & 44"**

- A. Mower Lift Chain, R.H.
- B. Tractor Lift Arm
- C. Clevis Pin, Long
- D. Safety Clip
- E. Mower Lift Chain, L.H.
- F. Clevis Pin, Short
- G. Washer



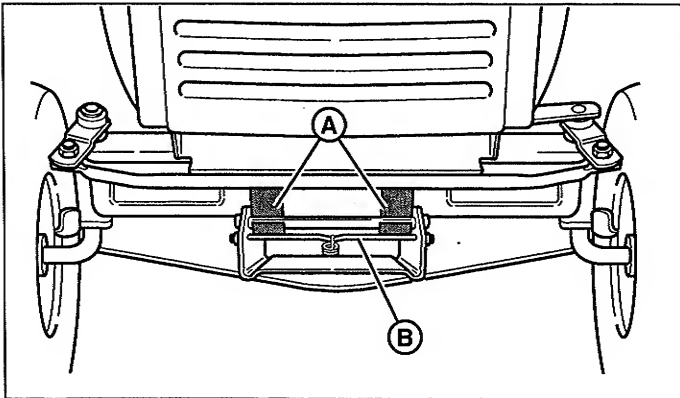
**Figure 9. Mower Lift - 50" Manual Lift Models**

- A. Hair Pin Clip
- B. Clevis Pin (Inserted Left to Right)
- C. Lift Cable
- D. Clevis Pin (Inserted Right to Left)
- E. Hair Pin Clip & Washer
- F. Mower Lift Arm



**Figure 10. Removing & Installing Belt**

- A. Idler Arm
- B. PTO Pulley



**Figure 11. Mower Hitch**

- A. Tractor Hitch Brackets
- B. Spring-Loaded Lever

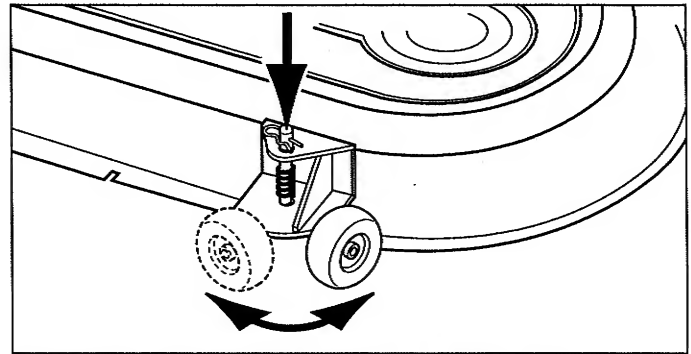
## Removing the Mower Deck - 54" Models

1. Fully raise the attachment lift and rotate front gauge wheels (see Figure 12).
2. Park the tractor, fully lower the attachment lift, turn off the PTO, turn off the engine, remove the key, and engage the parking brake.

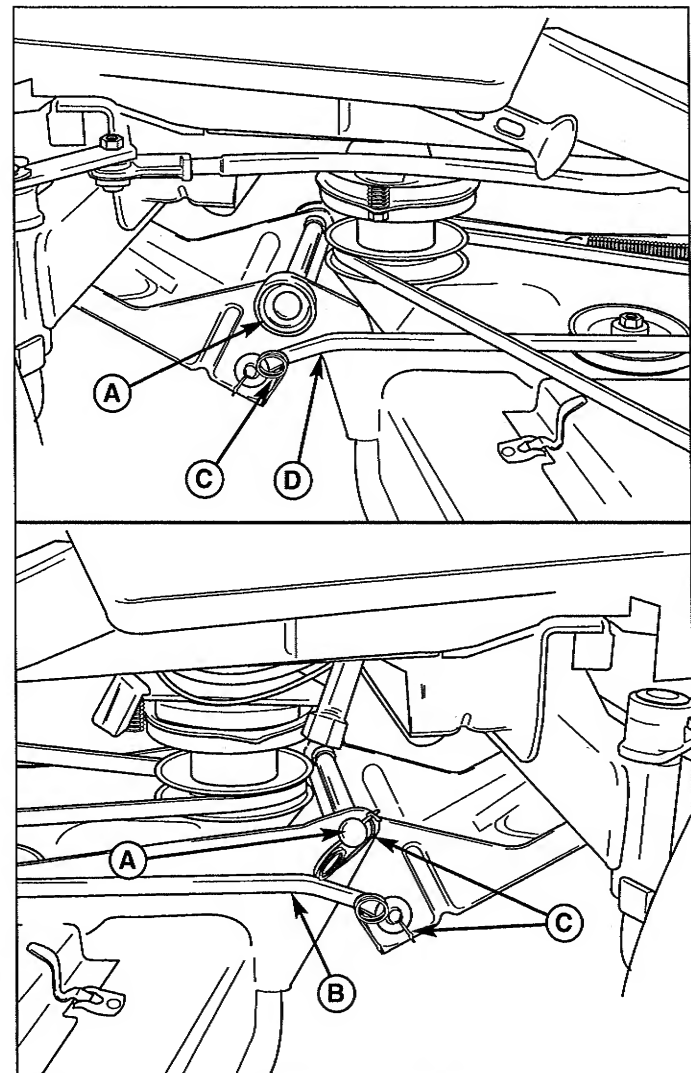
### CAUTION

The muffler and surrounding areas may be hot.

3. Place mower in the lowest cutting position using the mower height adjuster (B, Figure 7).
4. Disconnect the mower lift chains (A, E, Figure 8) from the tractor lift arm (B). Re-install clevis pins, washers and safety clips on mower lift arms for storage.
5. Remove belt from PTO pulley (B, Figure 10).
6. Turn wheels straight ahead. Pull back on spring-loaded lever (B, Figure 11) and lift mower hitch off of the tractor brackets (A).
7. Remove the clips (C, Figure 13) and washers securing the hitch rod (A) and leveling rods (B, D). Remove the hitch rod (A) and hitch bucket.
8. Turn wheels fully left, and slide mower deck out from under the right side of the tractor.



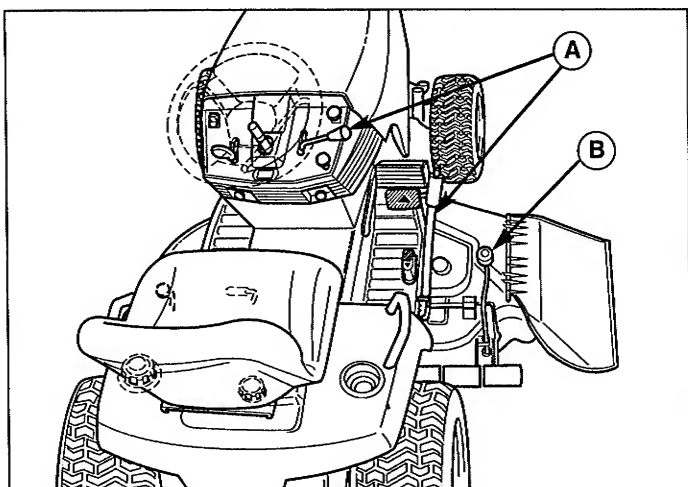
**Figure 12. Gauge Wheels - 54" Models Only**



**Figure 13. Hitch Hardware - 54" Models Only**

- A. Hitch Rod
- B. Right Leveling Rod
- C. Safety Clips
- D. Left Leveling Rod

# Operating the Tractor



**Figure 14. Raising & Lowering Mower**

- A. Mower Lift Lever
- B. Mower Height Adjuster

## **! WARNING**

Engage parking brake, disengage PTO, stop engine and remove key before attempting to install or remove the mower.

Muffler and surrounding areas may be hot.

## **Installing the Mower Deck - All Hydraulic Lift Models & 44" Manual Lift Models**

*NOTE: Perform mower installation on a hard, level surface such as a concrete floor.*

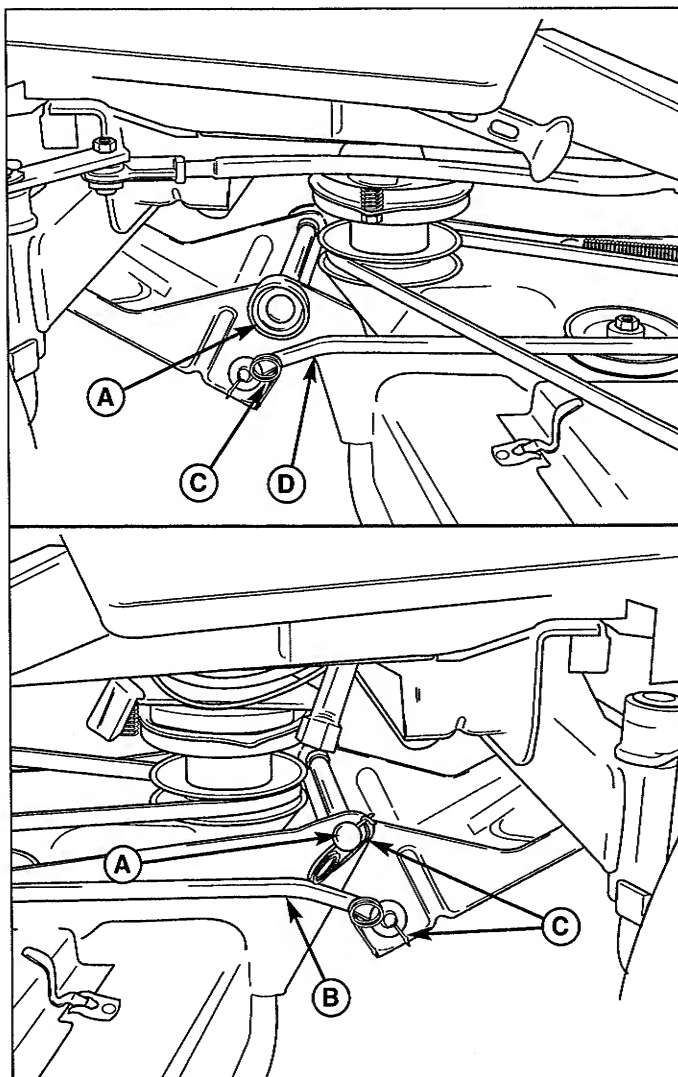
1. Park the tractor, fully lower the attachment lift, turn off the PTO switch, turn off the engine, remove the key, and engage the parking brake. Turn the wheels fully to the left.
2. Place mower in the lowest cutting position using the mower height adjuster (B, Figure 14). Slide the mower deck under the right side of tractor so that the mower hitch is aligned with front tractor hitch (A, Figure 16).

### **54" MODELS ONLY**

3. After sliding the mower under the tractor, install the hitch rod (A, Figure 15) and leveling rods (B, D). Secure with washers and clips (C).

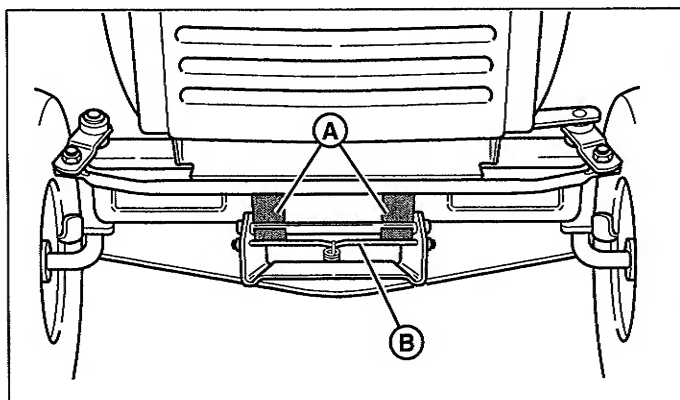
### **ALL MODELS**

3. See Figure 16. Turn wheels straight. Pull back on the spring-loaded lever (B) while lifting up on the mower hitch. Install the mower hitch onto tractor hitch brackets (A). When properly installed, the spring-loaded lever should seat fully underneath the brackets (A).



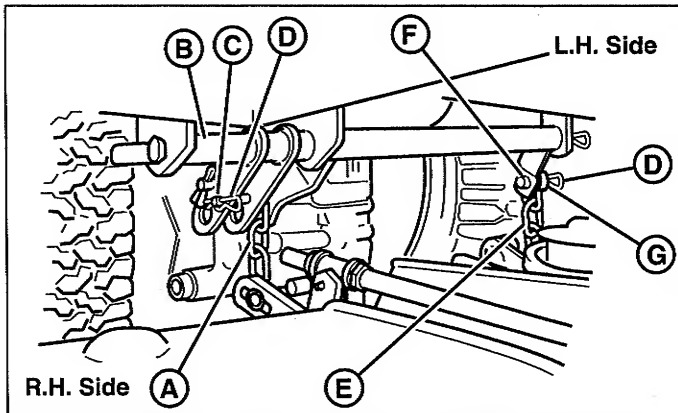
**Figure 15. Hitch Hardware - 54" Models Only**

- A. Hitch Rod
- B. Right Leveling Rod
- C. Safety Clips
- D. Left Leveling Rod



**Figure 16. Mower Hitch**

- A. Tractor Hitch Brackets
- B. Spring-Loaded Lever



**Figure 17. Mower Lift - Hydraulic Lift Models & 44"**

- |                           |                           |
|---------------------------|---------------------------|
| A. Mower Lift Chain, R.H. | E. Mower Lift Chain, L.H. |
| B. Tractor Lift Arm       | F. Clevis Pin, Short      |
| C. Clevis Pin, Long       | G. Washer                 |
| D. Safety Clip            |                           |

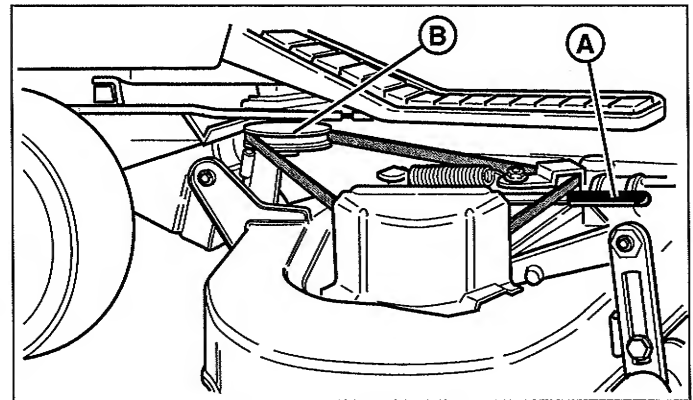
- See Figure 17. Connect the mower lift chains (A & E) to the tractor lift arm (B) using the clevis pins, washers and safety clips. Install the shorter clevis pin (F) on the left side as shown.
- See Figure 18. From left side of tractor, use the idler arm (A) to relieve belt tension. Install belt onto the PTO pulley (B).

## 54" MODELS ONLY

- Raise the attachment lift and rotate the front gauge wheels (Figure 12) into cutting position.

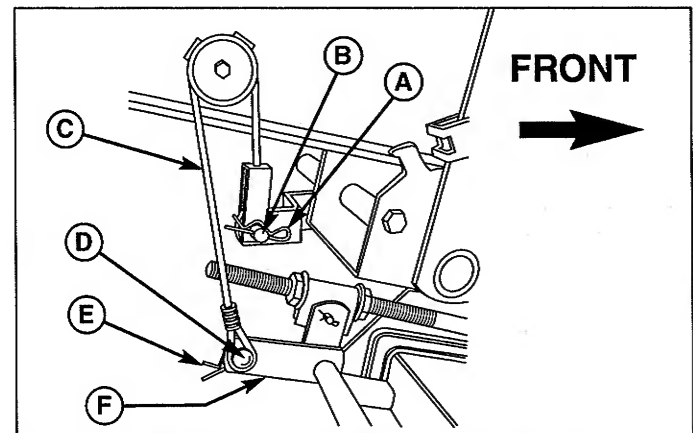
## Installing the Mower Deck - 50" Manual Lift Models

- Park the tractor, fully lower the attachment lift, turn off the PTO switch, turn off the engine, remove the key, and engage the parking brake. Turn the wheels fully to the left.
- Place mower in the lowest cutting position using the mower height adjuster (B, Figure 14). Slide the mower deck under the right side of tractor so that the mower hitch is aligned with front tractor hitch (A, Figure 16).
- See Figure 16. Turn wheels straight. Pull back on the spring-loaded lever (B) while lifting up on the mower hitch. Install the mower hitch onto tractor hitch brackets (A). When properly installed, the spring-loaded lever should seat fully underneath the brackets (A).



**Figure 18. Removing & Installing Belt**

- |               |
|---------------|
| A. Idler Arm  |
| B. PTO Pulley |



**Figure 19. Mower Lift - 50" Manual Lift Models**

- |  |
|--|
| A. Hair Pin Clip                       |
| B. Clevis Pin (Inserted Left to Right) |
| C. Lift Cable                          |
| D. Clevis Pin (Inserted Right to Left) |
| E. Hair Pin Clip & Washer              |
| F. Mower Lift Arm                      |

- See Figure 19. Connect the mower lift cable (C) to the mower lift arm (F) using a clevis pin (D), hair pin clip and washer (E).

**IMPORTANT NOTE:** For both lift cables, the mower clevis pin (D) is installed from right to left; the tractor lift clevis pin (B) is installed from left to right. The pins must be installed in this orientation for proper clearance.

- See Figure 18. From left side of tractor, use the idler arm (A) to relieve belt tension. Install belt onto the PTO pulley (B).

## STORAGE

### Temporary Storage (30 Days Or Less)

Remember, the fuel tank will still contain some gasoline, so never store the unit indoors or in any other area where fuel vapor could travel to any ignition source. Fuel vapor is also toxic if inhaled, so never store the unit in any structure used for human or animal habitation.

Here is a checklist of things to do when storing your unit temporarily or in between uses:

- Keep the unit in an area away from where children may come into contact with it. If there's any chance of unauthorized use, disconnect the spark plug wires.
- If the unit can't be stored on a reasonably level surface, chock the wheels.
- Clean all grass and dirt from the mower.

*NOTE: If storing your tractor between winter snow removal jobs in a cold area, we suggest that you fill the fuel tank at the completion of each job to prevent water condensation in the fuel tank. Wait for engine to cool before filling tank.*

### Long Term Storage (Longer Than 30 Days)

Before you store your unit for the off-season, read the Maintenance and Storage instructions in the Safety Rules section, then perform the following steps:

1. Drain crankcase oil and refill with a grade of oil that will be required when unit is used again.
2. Prepare the mower deck for storage as follows:
  - a. Remove mower deck from the unit.
  - b. Clean underside of mower deck.
  - c. Coat all bare metal surfaces with paint or light coat of oil to prevent rusting.
3. Clean external surfaces and engine.
4. Prepare engine for storage. See engine owner's manual.
5. Clean any dirt or grass from cylinder head cooling fins, engine housing and air cleaner element.
6. Cover air cleaner and exhaust outlet tightly with plastic or other waterproof material to keep out moisture, dirt and insects.
7. Completely grease and oil unit as outlined in the Normal Care section.
8. Clean up unit and apply paint or rust preventative to any areas where paint is chipped or damaged.
9. Be sure the battery is filled to the proper level with water and is fully charged. Battery life will be increased if it is removed, put in a cool, dry place and fully charged about once a month. If battery is left in unit, disconnect the negative cable.

## WARNING

**Never store the unit, with gasoline in engine or fuel tank, in a heated shelter or in enclosed, poorly ventilated enclosures. Gasoline fumes may reach an open flame, spark or pilot light (such as a furnace, water heater, clothes dryer, etc.) and cause an explosion.**

**Handle gasoline carefully. It is highly flammable and careless use could result in serious fire damage to your person or property.**

**Drain fuel into an approved container outdoors away from open flame or sparks.**

10. Drain fuel system completely or add a gasoline stabilizer to the fuel system. If you have chosen to use a fuel stabilizer and have not drained the fuel system, follow all safety instructions and storage precautions in this manual to prevent the possibility of fire from the ignition of gasoline fumes. Remember, gasoline fumes can travel to distant sources of ignition and ignite, causing risk of explosion and fire.

*NOTE: Gasoline, if permitted to stand unused for extended periods (30 days or more), may develop gummy deposits which can adversely affect the engine carburetor and cause engine malfunction. To avoid this condition, add a gasoline stabilizer to the fuel tank and run the engine a few minutes, or drain all fuel from the unit before placing it in storage.*

## STARTING AFTER LONG TERM STORAGE

Before starting the unit after it has been stored for a long period of time, perform the following steps.

1. Remove any blocks from under the unit.
2. Install the battery if it was removed.
3. Unplug the exhaust outlet and air cleaner.
4. Fill the fuel tank with fresh gasoline. See engine manual for recommendations.
5. See engine owner's manual and follow all instructions for preparing engine after storage.
6. Check crankcase oil level and add proper oil if necessary. If any condensation has developed during storage, drain crankcase oil and refill.
7. Inflate tires to proper pressure. Check fluid levels.
8. Start the engine and let it run slowly. DO NOT run at high speed immediately after starting. Be sure to run engine only outdoors or in well ventilated area.



# Regular Maintenance

## MAINTENANCE SCHEDULE & PROCEDURES

The following schedule should be followed for normal care of your tractor and mower. Use the hour meter to determine your operating time.

SAFETY ITEMS	Before Each Use	Every 5 Hours	Every 25 Hours	Every 100 Hours	Every 250 Hours	Spring & Fall
Check Safety Interlock System						●
Check Tractor Brakes						●
Check Mower Blade Stopping Time				●		
NORMAL CARE ITEMS	Before Each Use	Every 5 Hours	Every 25 Hours	Every 100 Hours	Every 250 Hours	Spring & Fall
Check Tractor/Mower for loose hardware		●				
Check Engine Oil Level	●	***●				
Check / Change Engine Air Filter *, ***						
Change Engine Oil & Filter *, **						
Inspect Spark Plug(s) *						
Check / Clean Radiator Screen	●	***●				
Check / Add Engine Coolant	●	***●				
Check / Clean Oil Cooler (23HP Only)			***●			
Inspect Cooling System				Every 200 Hours		
Check / Replace Fuel Filter				●		
Check / Adjust PTO Clutch					****●	
Lubricate Tractor & Mower			***●			
Lubricate Rear Axle Shafts						Yearly
Check Battery Fluid				●		
Clean Battery & Cables				●		
Check Tire Pressure			●			
Clean & Sharpen Mower Blades				●		
Check Transmission Oil Level		●				
Change Transmission Oil					****●	
Change Internal Trans. Filter					****●	
Change Hydraulic System Filter					****●	

\* See the engine manufacturer's owner's manual.

\*\* Change original engine oil after initial break-in period. Refer to engine owner's manual.

\*\*\* More often in hot (over 85° F: 30° C) weather or dusty operating conditions.

\*\*\*\* Service after the first 50 hours of operation, then every 250 hours of operation.

**Always refer to the engine manufacturer's owner's manual for specific engine information.**

## Regular Maintenance

### WARNING

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

Do not remove fuel filter when engine is hot, as spilled gasoline may ignite. **DO NOT** spread hose clamps further than necessary. Ensure clamps grip hoses firmly over filter after installation.

## CHECKING / ADDING FUEL

To add fuel:

1. Remove the fuel cap (see A, Figure 20).
2. Fill the tank. Do not overfill. Leave room in the tank for fuel expansion. Refer to your engine manual for specific fuel recommendations.
3. Install and hand tighten the fuel cap.

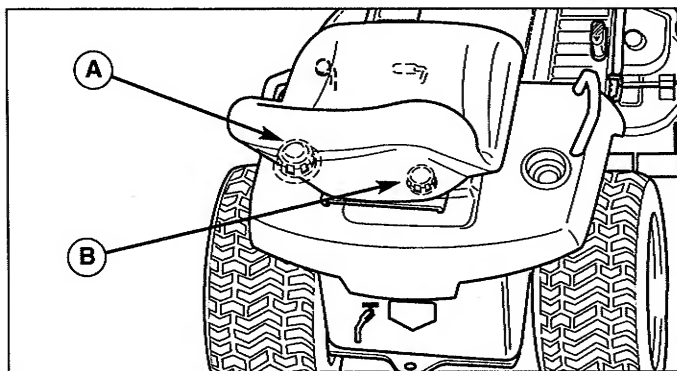


Figure 20. Fuel Tank Fill

- A. Fuel Tank Cap.  
B. Trans. Oil Seat Deck Plug



Do not use gasoline containing METHANOL, gasohol containing more than 10% ETHANOL, gasoline additives, or white gas because engine/fuel system damage could result.

## CHECK TIRE PRESSURES

**Service Interval: Every 25 Hours**

Tire Pressure should be checked periodically, and maintained at the levels shown in the chart. Note that these pressures may differ slightly from the "Max Inflation" stamped on the side-wall of the tires. The pressures shown provide proper traction, improve cut quality, and extend tire life.

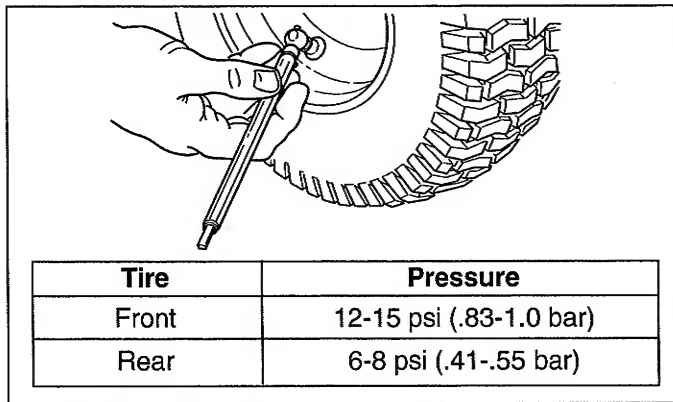


Figure 21. Checking Tire Pressure



Do not allow dirt, water, or other debris to enter the expansion chamber or transmission. Even a small amount of dirt can damage the transmission

There are several maintenance procedures that must be performed on the transmission after the first 50 hours of operation and then after every 250 hours.

### Transmission Service Information

**Transmission Oil Capacity:** Apx. 4-1/2 qt (4.25L)

**Transmission Oil Type:** SAE 10W-30 with a minimum API rating of SG/CD.

**Internal Oil Filter Part Number:** 1719832

**Hydraulic System Oil Filter Part Number:** 1719168

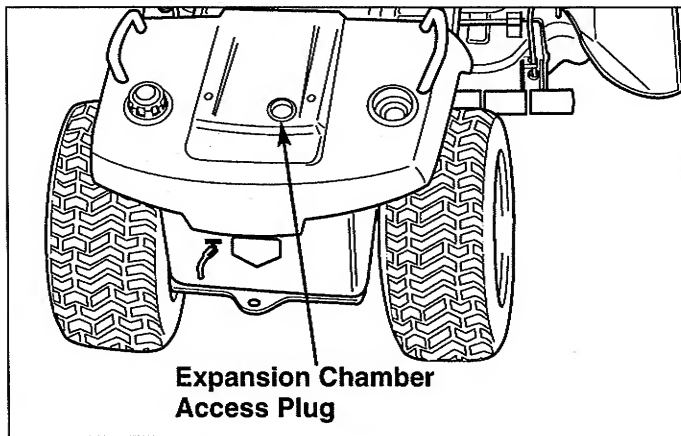
### Check Transmission Oil Level

**Service Interval: Every 5 Hours**

**NOTE:** Lift cylinder should be extended.

1. Locate the clear tube (C, Figure 23) and expansion chamber (D) under the seat deck. Using a flashlight, observe the oil level in the clear tube. 1" of oil should be visible in the clear tube. **DO NOT OVERFILL.** Empty space is required in the tube and expansion chamber for heat expansion.
2. If necessary, remove the plug from the seat deck (Figure 22), clean the area surrounding the expansion chamber (D, Figure 23), remove the cap, and add oil.





**Figure 22. Seat Deck Access Plug**



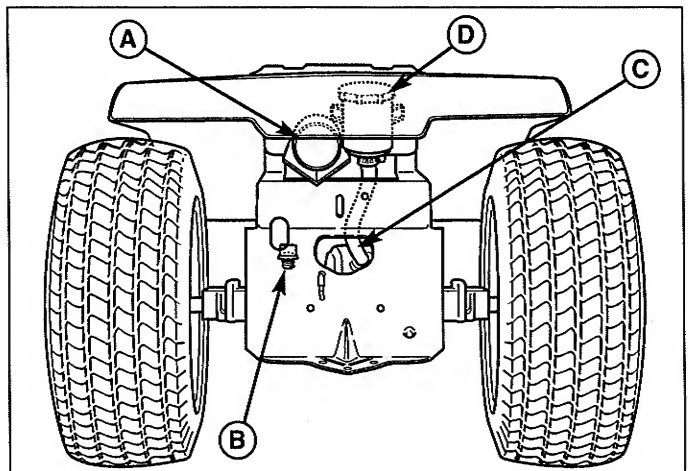
Do not allow dirt, water, or other debris to enter the expansion chamber or transmission. Even a small amount of dirt can damage the transmission

## Change Transmission Oil, Internal Filter, & Hydraulic System Filter

**Service Interval: After 50 Hrs, Then Every 250 Hrs**

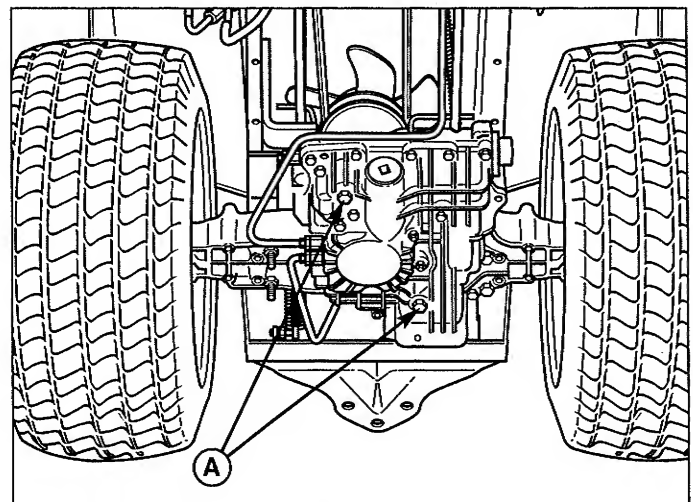
*The oil should also be changed whenever it has become discolored from overheating or contamination.*

1. Place a drain pan under the transmission and remove the two 14mm drain plugs (A, Figure 24).
2. Remove the differential fill cap (B, Figure 23).
3. Remove the plastic plug (A, Figure 25).
4. Remove and replace the hydraulic system filter (A, Figure 23). Thread the new filter onto the filter base and tighten 1/2 to 3/4 turns past finger tight.
5. Remove and replace the internal transmission filter (B, Figure 25).
6. Reinstall the plastic plug (A, Figure 25) and the two 14mm drain plugs (A, Figure 24).
7. Using a long funnel, add 2 quarts of oil to the differential fill (the differential fill cap B, Figure 23 should have been removed earlier).
8. Reinstall the differential fill cap (B, Figure 23).
9. Remove the expansion chamber access plug (Figure 22) and expansion chamber cover. Add 2 quarts (1.9L) of oil to the expansion chamber (D, Figure 23) a few ounces at a time.
10. Reinstall the expansion chamber cover (D, Figure 23) and access plug (Figure 22).
11. Test run the tractor for 10 minutes. Drive forward and backward; raise and lower the attachment lift several times.
12. Recheck the transmission oil level. There should be 1" (2.5cm) of oil visible in the clear plastic Tube (C, Figure 23). **DO NOT OVERFILL.** Empty space is required in the tube and expansion chamber for heat expansion.



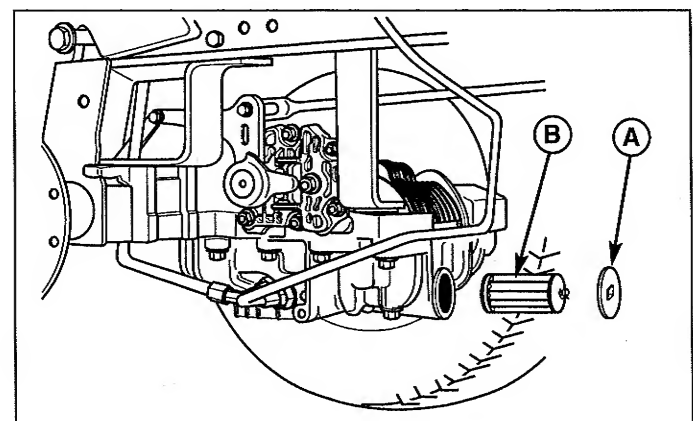
**Figure 23. Hydraulic System Oil Filter**

A. Hydraulic System Filter C. Clear Tube  
B. Differential Fill Cap D. Expansion Chamber



**Figure 24. Transmission Drain Plugs**

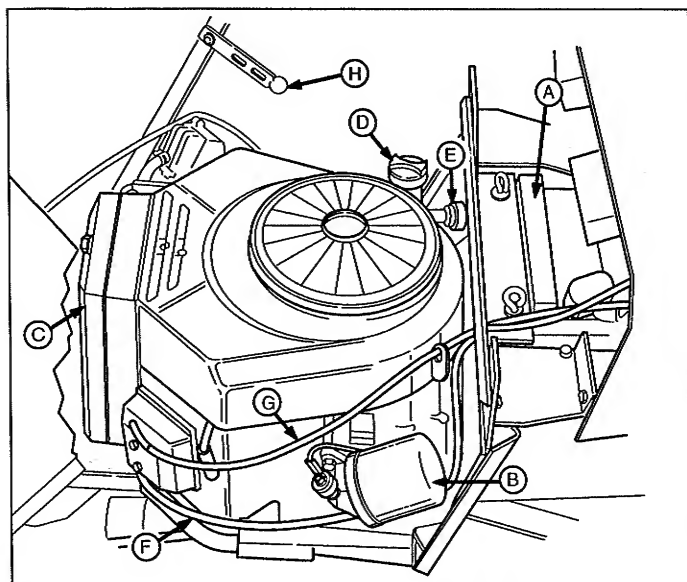
A. 14mm Drain Plugs



**Figure 25. Internal Transmission Filter Service**

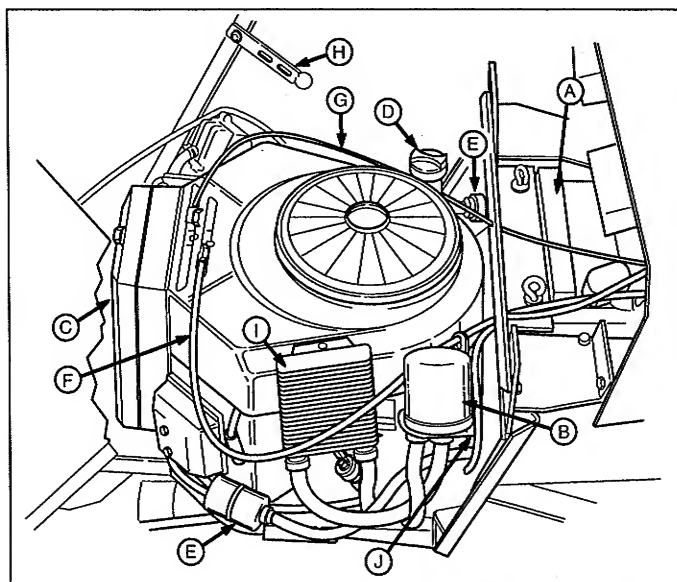
A. Plastic Plug B. Internal Filter

## Regular Maintenance



**Figure 26. Engine Compartment - 18HP & 20HP Briggs & Stratton Models**

- |                      |                   |
|----------------------|-------------------|
| A. Battery           | E. Fuel Filter    |
| B. Oil Filter        | F. Throttle Cable |
| C. Air Filter        | G. Choke Cable    |
| D. Oil Fill/Dipstick | H. Hood Strap     |



**Figure 27. Engine Compartment - 23HP Kohler Model**

- |                      |                      |
|----------------------|----------------------|
| A. Battery           | F. Throttle Cable    |
| B. Oil Filter        | G. Choke Cable       |
| C. Air Filter        | H. Hood Strap        |
| D. Oil Fill/Dipstick | I. Oil Cooler        |
| E. Fuel Filter       | J. Filter Base Bolts |

## ACCESSING THE ENGINE

To gain access to the engine, unhook the rubber straps (H, Figures 26, 27) and tip the hood forward.

**NOTE:** For engine service item locations see Figure 26 for models with Briggs & Stratton engines, Figure 27 for models with Kohler engines, and Figure 28 for models with Kawasaki engines.

## CHECK / REPLACE FUEL FILTER

**Service Interval:** Every 100 Hours

The fuel filter (E, Figures 26 & 27; A, Figure 28) is located in the fuel line between the fuel tank and the carburetor.

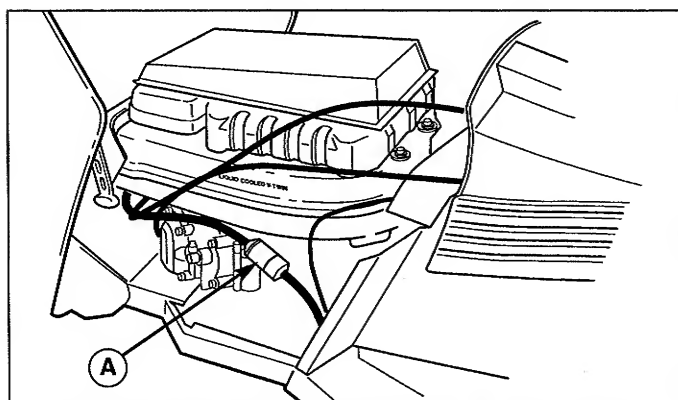
If filter is dirty or clogged, replace as follows:

1. Disengage the PTO, engage the parking brake, turn the ignition switch OFF, and remove the key. Allow the engine to cool. Disconnect the negative battery cable.
2. Place a container below the filter to catch spilled fuel.
3. Using a pliers, open and slide hose clamps from fuel filter.
4. Remove hoses from filter.
5. Install new filter in proper flow direction in fuel line.
6. Secure with hose clamps.
7. Reconnect the negative battery cable when finished.

## CHECK / CHANGE AIR FILTER

**Service Interval:** See Engine Manual

Refer to the engine manual for specific air filter service procedures.



**Figure 28. Engine Compartment (View from Left)**

- A. Fuel Filter

## ENGINE OIL & FILTER CHANGE

**Service Interval:** See Engine Manual

Refer to engine manual for specific oil and filter recommendations and oil draining procedures.

**NOTE, 23HP Kohler Models:** To change the oil filter, loosen the bolts (J, Figure 27) securing the filter base to the rear engine compartment wall. Lift the oil filter base off the bolts and tilt the assembly away from the engine. Remove the filter and drain the base. Reinstall the filter base before installing a new filter. Be sure not to kink the hoses

## INSPECT & REPLACE SPARK PLUGS

**Service Interval:** See Engine Manual

Refer to the engine manual for specific spark plug replacement procedures.

### CHECK / CLEAN RADIATOR SCREEN (LIQUID COOLED MODELS)

**Service Interval: Before Each Use, or Every 5 Hours**

Remove, check, and clean the radiator screen before each use and more often if cutting in dry or dusty conditions.

### CHECK / ADD COOLANT (LIQUID COOLED MODELS)

**Service Interval: Before Each Use or Every 5 Hours**

The engine coolant level and quality should be checked before each use, when the engine is off and cool.

1. Check coolant in the overflow reservoir (C, Figure 29). Coolant should be green in color and coolant level should be between the "H" and "L" marks on the tank.
2. If the coolant level is below the "L" mark on the overflow reservoir, then with the engine off and cool, remove the radiator cap (D, Figure 29). Add coolant (50/50 mixture of ethylene glycol and distilled water), slowly fill the tank to the bottom of the radiator cap filler neck.
3. Inspect for leaks in system as described below:

### CHECK / CLEAN OIL COOLER (KOHLEL MODELS)

**Service Interval: Every 25 Hours, or As Necessary**

The engine oil cooler is located on the side of the engine (I, Figure 27) and should be cleaned with compressed air at regular intervals or if dirty.

### COOLING SYSTEM INSPECTION (LIQUID COOLED MODELS)

**Service Interval: Every 200 Hours**

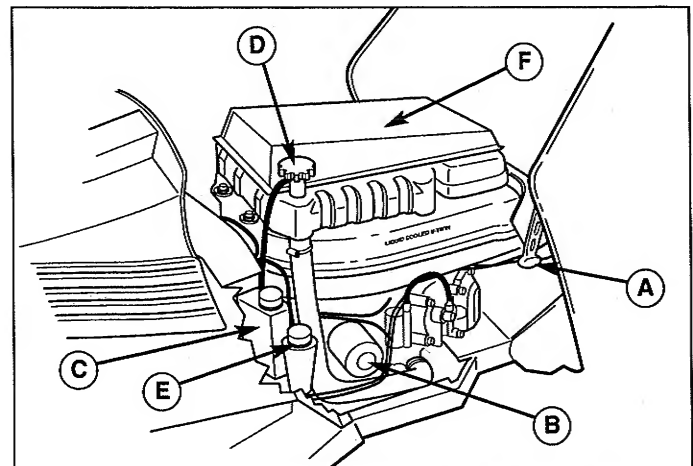
Inspect the radiator and the hoses at least after every 200 hours of operation.

1. Inspect radiator inlet and outlet tubes for cracks, kinks, dents, and fractured seams. Have radiator repaired or replaced if necessary.
2. Check for dirt and insects that may be lodged in the radiator. Clean them out using compressed air or a low-pressure washer.

### SAFETY INTERLOCK SYSTEM CHECK

**Service Interval: Every Fall & Spring**

Check the function of the safety interlock system using the test procedure found on page 11 of this manual. If the tractor fails any of the tests, see your dealer.



**Figure 29. Engine Compartment (View from Right)**

- |                       |                      |
|-----------------------|----------------------|
| A. Rubber Strap       | D. Radiator Cap      |
| B. Oil Filter         | E. Oil Fill/Dipstick |
| C. Overflow Reservoir | F. Radiator Screen   |

### BLADE BRAKE CHECK

**Service Interval: Every 100 Hours or Fall & Spring**

Mower blades and mower drive belt should come to a complete stop within five seconds after electric PTO switch is turned off.

1. With tractor in neutral, PTO disengaged and operator in seat, start the engine.
2. Look over the left-hand footrest at the mower drive belt. Engage the PTO and wait several seconds. Disengage the PTO and check the amount of time it takes for the mower drive belt to stop.
3. If mower drive belt does not stop within five seconds, re-adjust the clutch or see your dealer.

### PTO CLUTCH ADJUSTMENT CHECK

**Service Interval: After 50 Hrs, Then Every 250 Hrs**

Check the PTO clutch adjustment after the initial 50 hour break-in period and then after every 250 hours of operation—or if the clutch starts slipping or will not engage. Check and adjust the clutch using the procedure outlined in the Adjustments section of this manual.

# Regular Maintenance

## BATTERY MAINTENANCE

### ⚠ WARNING

Be careful when handling the battery. Avoid spilling electrolyte. Keep flames and sparks away from the battery.

When removing or installing battery cables, disconnect the negative cable **FIRST** and reconnect it **LAST**. If not done in this order, the positive terminal can be shorted to the frame by a tool.

### Checking the Battery Fluid

**Service Interval: Every 100 Hours**

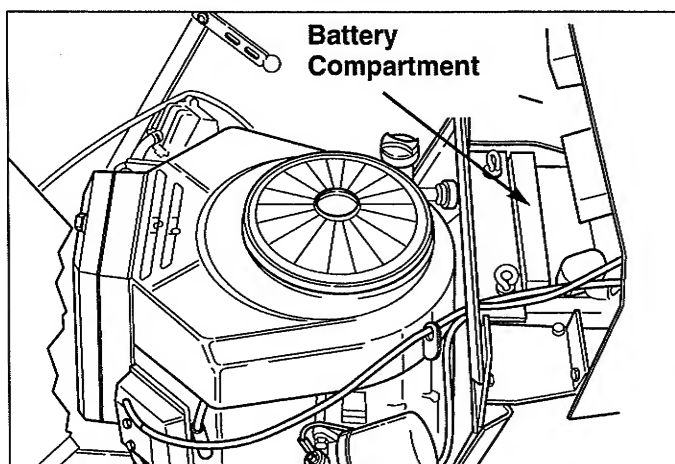
*Note: Does not apply to maintenance-free batteries.*

1. Raise the hood to access battery compartment (see Figure 30).
2. Remove the battery filler cap(s). Fluid must be even with the split ring full mark (C, Figure 31). If not, add distilled water.
3. Reinstall the filler cap(s).

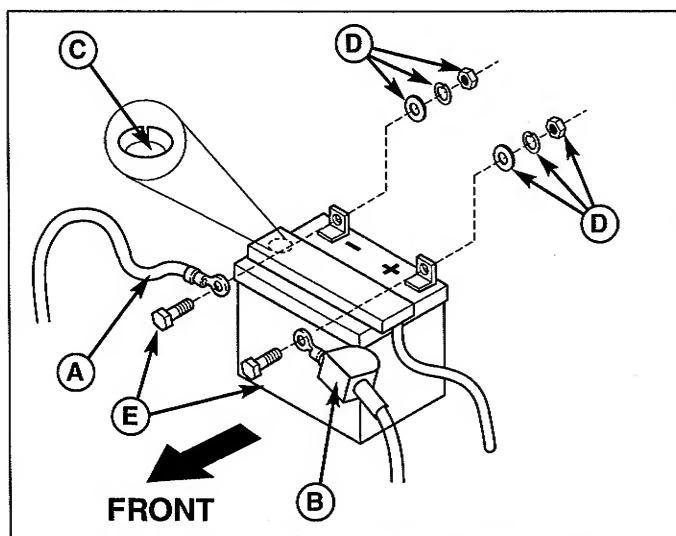
### Cleaning the Battery and Cables

**Service Interval: Every 100 Hours**

1. Disconnect the cables from the battery, negative cable first (A, Figures 31 & 32).
2. Remove the battery hold-down and battery.
3. Clean the battery compartment with a solution of baking soda and water.
4. Clean the battery terminals and cable ends with a wire brush and battery terminal cleaner until shiny.
5. Reinstall the battery in the battery compartment, and secure with the battery hold-down.
6. Reattach the battery cables, positive cable first (B, Figures 31 & 32).
7. Coat the cable ends and battery terminals with petroleum jelly or non-conducting grease.

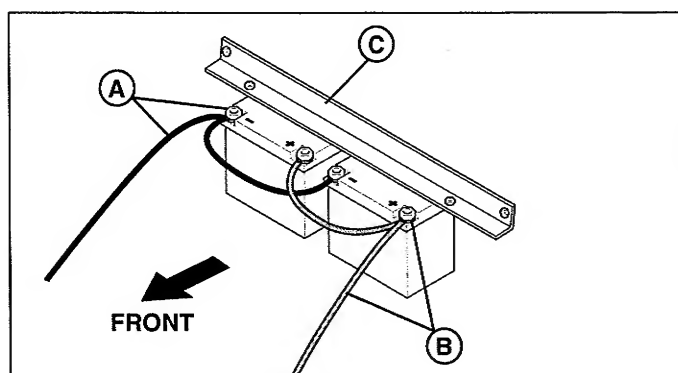


**Figure 30. Battery Compartment (Air Cooled Model Shown)**



**Figure 31. 18HP & 20HP Battery Cables & Fill**

- A. Negative Cable
- B. Positive Cable & Cover
- C. Split-Ring
- D. Nut, Lockwasher, & Washer
- E. Capscrew



**Figure 32. 17Hp LC Battery Connections**

- A. Negative Cable & Terminal
- B. Positive Cable & Terminal
- C. Hold Down Bar

## LUBRICATION

### Service Interval: Every 25 Hours

Lubricate the unit at the locations shown in Figures 33 through 38 as well as the following lubrication points.

#### Grease:



- front axle pivot
- front wheel bearings
- front axle grease fittings
- steering linkage
- foot pedal
- mower pivots
- mower arbors
- transmission idler assembly pivot
- rear axle shafts (remove wheel hubs)

Use grease fittings when present. Disassemble parts to apply grease to moving parts when grease fittings are not present.

Not all greases are compatible. Simplicity Lithium Grease is recommended, automotive-type lithium grease may be used when this is not available.

#### Oil:



- hydro linkage
- seat adjustment assembly
- brake linkage
- frame pivot points
- mower deck height adjustment linkage
- manual lift lever

Generally, all moving metal parts should be oiled where contact is made with other parts. Keep oil and grease off belts and pulleys. Remember to wipe fittings and surfaces clean both before and after lubrication.

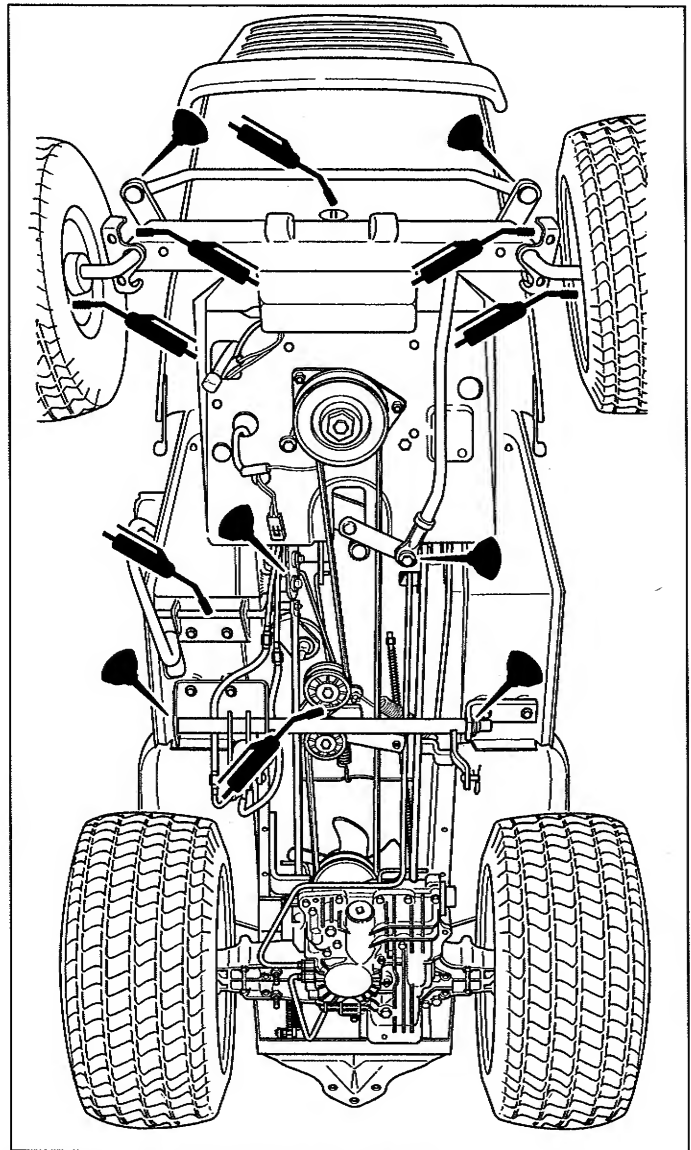


Figure 34. Lubricating the Tractor

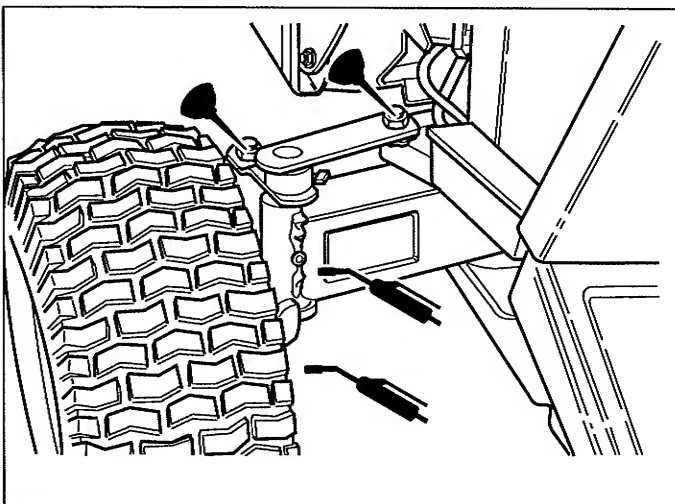


Figure 33. Lubricate Steering Linkage

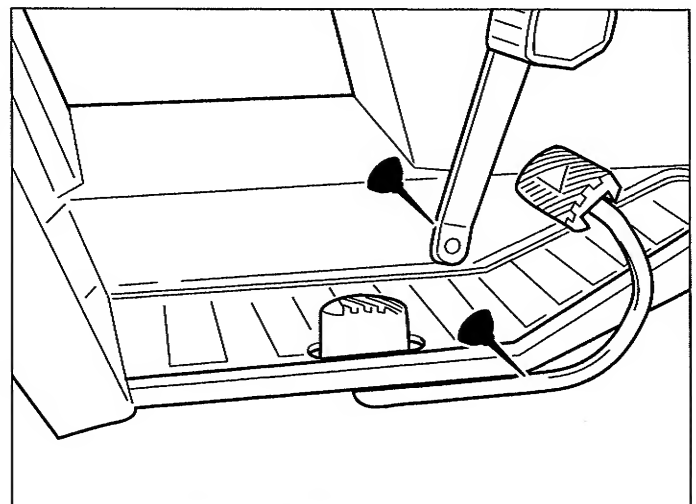
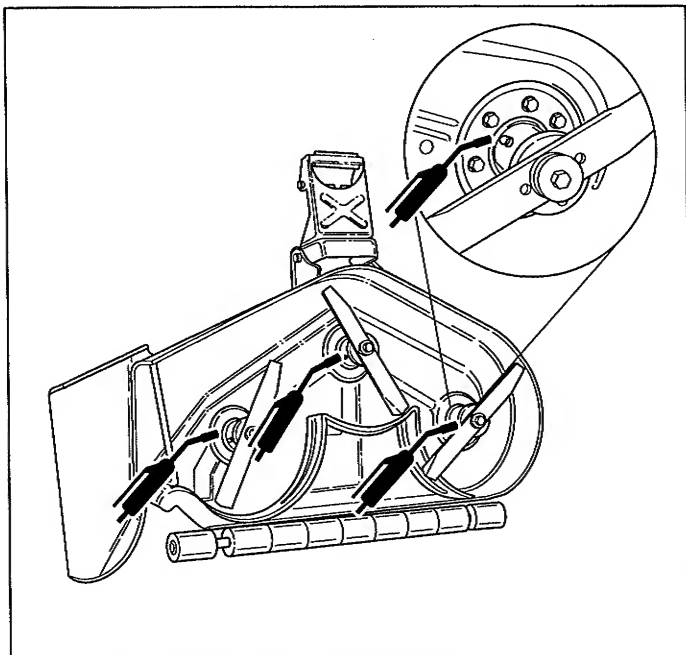


Figure 35. Brake Pedal Pivot Point



**Figure 36. Arbor Lubrication Points**

## Lubricate Rear Axle Shafts

### Service Interval: Yearly

We recommend removing the rear wheel hubs and lubricating the axle shafts yearly. This prevents the wheel hubs from seizing onto the axle shaft and makes future service easier.

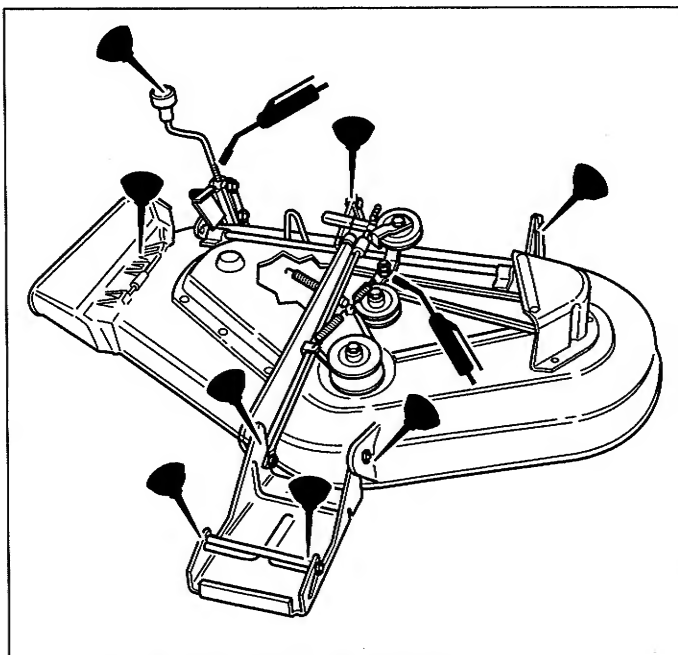
1. Turn off the ignition, turn off the PTO, engage the parking brake, and block the front tires.
2. Using a jack or chain hoist positioned at the center of the rear frame, carefully jack the unit up until the rear tires are approximately 1" - 2" (2.5-5cm) off the ground.

**NOTE:** For overall unit stability during service, do not jack rear end higher than required for wheel removal.

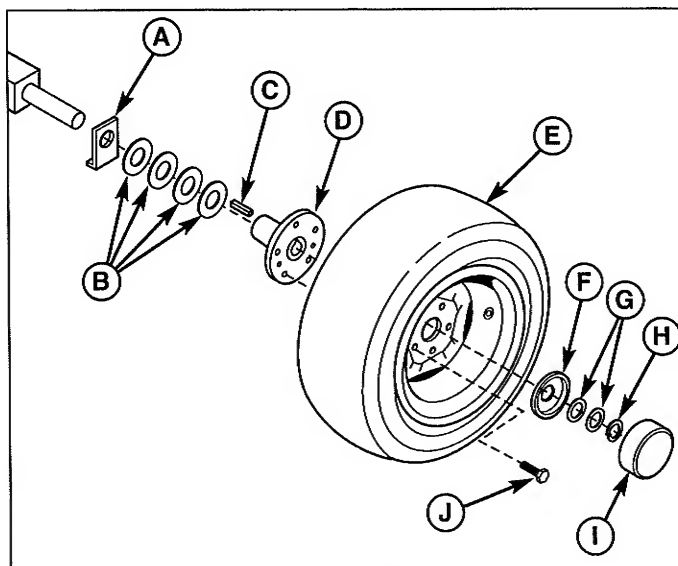
3. Support the rear of the unit on jackstands positioned under the rear frame.

**NOTE:** Your axle assembly may differ slightly from the assembly pictured: the quantity of washers (G, Figure 38) may be one or two. This is adjusted on a tractor by tractor basis during assembly to allow a small amount of axle end-play.

4. Remove the wheel bolts (J, Figure 38) and wheels (E).
5. Remove the plastic hub cap (I).
6. Remove E-ring (H) using a screwdriver.
7. Remove the washers (G), hub cap retainer (F), and wheel hub (D). Remove the key (C).
8. Lubricate the axle shaft with anti-seize compound or lithium grease.



**Figure 37. Mower Lubrication Points**



**Figure 38. Rear Axle Assembly**

- |                         |                                |
|-------------------------|--------------------------------|
| A. Anti-Rotation Washer | F. Hub Cap Retainer            |
| B. Large Washers        | G. Small Washers (As Required) |
| C. Key                  | H. E-Ring                      |
| D. Wheel Hub            | I. Hub Cap                     |
| E. Wheel & Tire Assy.   | J. Capscrew                    |

9. Reinstall the components in reverse order of disassembly and lower the unit. Be sure the key (C) is in place in the axle keyway.



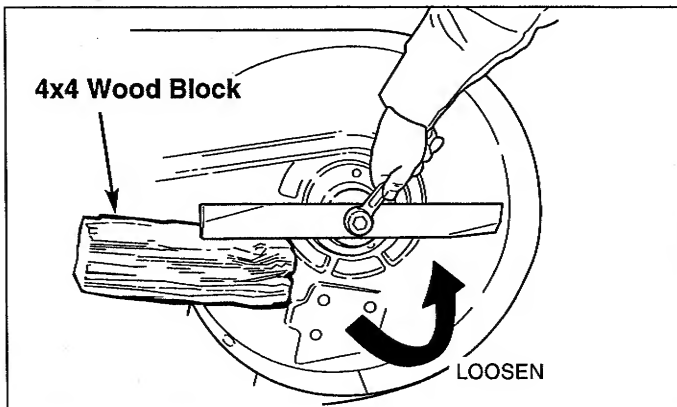


Figure 39. Removing the Blade

## SERVICING THE MOWER BLADES

### ⚠ WARNING

For your personal safety, do not handle the sharp mower blades with bare hands. Careless or improper handling of blades may result in serious injury.

#### Service Interval: Every 100 Hours or As Required

1. Remove mower from the tractor. See Mower Installation & Removal.
2. Blades should be sharp and free of nicks and dents. If not, sharpen blades as described in following steps.
3. To remove blade for sharpening, use a wood block to hold blade while removing the blade mounting cap-screw (Figure 39).
4. Use a file to sharpen blade to a fine edge. Remove all nicks and dents in the blade edge. If the blade is severely damaged, it should be replaced.
5. Balance the blade as shown in Figure 40. Center the blade's hole on a nail lubricated with a drop of oil. A balanced blade will remain level.

#### 44" & 50" MODELS

6. Reinstall each blade with the tabs pointing up toward deck as shown in Figure 41. Secure with a capscrew, spring washer and hex washer (be certain the hex washer is aligned with the hex shaft). Use a wooden block to prevent blade rotation and torque capscrews to 45-55 ft.lbs. (61-75 N.m.).

#### 54" MODELS

6. Reinstall each blade with the tabs pointing up toward deck as shown in Figure 42. Secure with a capscrew, spring washer and spline washer (be certain the spline washer is aligned with the shaft). Use a wooden block to prevent blade rotation and torque capscrews to 45-55 ft.lbs. (61-75 N.m.).

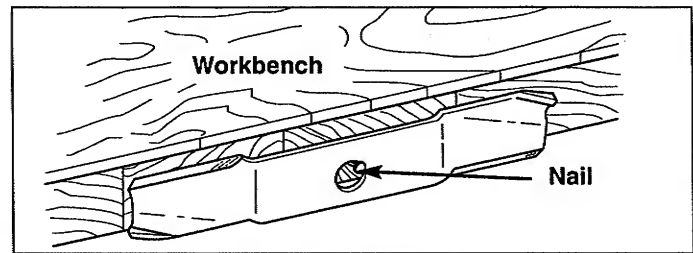


Figure 40. Balancing The Blade

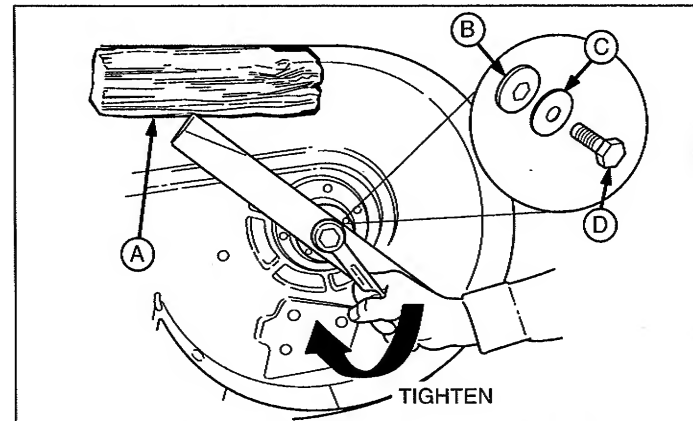


Figure 41. Installing The Blade - 44" & 50" Models

- |                   |                  |
|-------------------|------------------|
| A. 4x4 Wood Block | C. Spring Washer |
| B. Hex Washer     | D. Blade Bolt    |

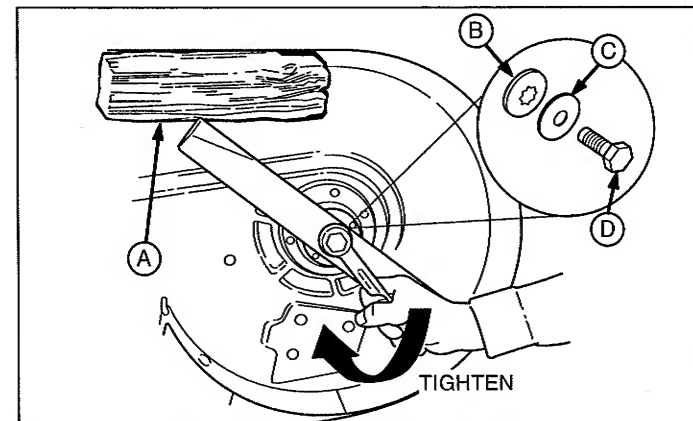


Figure 42. Installing The Blade - 54" Models

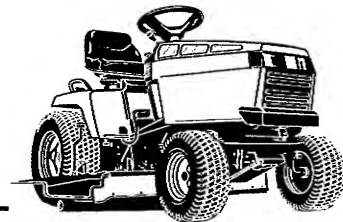
- |                   |                  |
|-------------------|------------------|
| A. 4x4 Wood Block | C. Spring Washer |
| B. Spline Washer  | D. Blade Bolt    |

### ⚠ WARNING

For your personal safety, blade mounting capscrews must each be installed with a hex washer and spring washer, then securely tightened. Torque blade mounting capscrew to 45 - 55 ft. lbs. (61 - 75 N.m.)



# Troubleshooting, Adjustment, & Service



## TROUBLESHOOTING

While normal care and regular maintenance will extend the life of your equipment, prolonged or constant use may eventually require that service be performed to allow it to continue operating properly.

The troubleshooting guide below lists the most common problems, their causes and remedies.

See the information on the following pages for instructions on how to perform most of these minor adjustments and service repairs yourself. If you prefer, all of these procedures can be performed for you by your local authorized dealer.

## WARNING

**To avoid serious injury, perform maintenance on the tractor or mower only when the engine is stopped and the parking brake engaged.**

**Always remove the ignition key, disconnect the spark plug wire and fasten it away from the plug before beginning the maintenance, to prevent accidental starting of the engine.**

## TROUBLESHOOTING THE TRACTOR

PROBLEM	CAUSE	REMEDY
<b>Engine will not turnover or start.</b>	1. Brake pedal not depressed.	Fully depress brake pedal.
	2. PTO (electric clutch) switch in ON position.	Place in OFF position.
	3. Out of fuel.	If engine is hot, allow it to cool, then refill the fuel tank.
	4. Engine flooded.	Disengage choke.
	5. Circuit breaker tripped.	Wait one minute for automatic reset.
		Replace if defective.
	6. Battery terminals require cleaning.	See Battery Maintenance Section.
	7. Battery discharged or dead.	Recharge or replace.
	8. Wiring loose or broken.	Visually check wiring & replace broken or frayed wires. Tighten loose connections.
	9. Solenoid or starter motor faulty.	See your dealer.
	10. Safety interlock switch faulty	See your dealer.
	11. Spark plug(s) faulty, fouled or incorrectly gapped.	Clean and gap or replace.
	12. Water in fuel.	See engine manual.
	13. Gas is old or stale.	Drain fuel & refill with fresh fuel. Replace fuel filter.
<b>Engine starts hard or runs poorly.</b>	1. Fuel mixture too rich.	Clean air filter. Check choke adjustment
	2. Spark plug(s) faulty, fouled, or incorrectly gapped.	Clean and gap or replace.
<b>Engine knocks.</b>		See engine manual.
<b>Excessive oil consumption.</b>	1. Low oil level.	Check/add oil as required.
	2. Using wrong grade oil.	See engine manual.
	3. Engine running too hot.	Clean engine fins, blower screen and air cleaner. Clean radiator screen.
<b>Engine exhaust is black.</b>	1. Dirty air filter.	See engine manual.
	2. Choke closed.	Open choke.
	3. Too much oil in crankcase.	Drain excess oil.
<b>Engine runs, but tractor will not drive.</b>	1. Ground speed control pedals not depressed.	Replace air filter. See engine manual.
	2. Transmission release lever in "push" position.	Open choke.
	3. Drive belt is broken.	Depress pedals.
	4. Drive belt slips.	Move into drive position.
	5. Brake is not fully released.	See Drive Belt Replacement. See cause and remedy below. See Brake Adjustment.

## Tractor Troubleshooting Cont.

Tractor drive belt slips.	<ol style="list-style-type: none"> <li>1. Clutch/brake is out of adjustment.</li> <li>2. Pulleys or belt greasy or oily.</li> <li>3. Belt stretched or worn.</li> <li>4. Idler pulley pivot bracket "frozen" in declutched position.</li> </ol>	<p>See Adjustments Section. Clean as required. Replace with new belt. Remove idler pulley bracket, clean and lubricate.</p>
Brake will not hold.	<ol style="list-style-type: none"> <li>1. Brake is incorrectly adjusted.</li> <li>2. Internal brake worn.</li> </ol>	<p>See Brake Adjustment. See your dealer.</p>
Tractor steers hard or handles poorly.	<ol style="list-style-type: none"> <li>1. Steering linkage is loose.</li> <li>2. Improper tire inflation.</li> <li>3. Front wheel spindle bearings dry.</li> </ol>	<p>Check and tighten any loose connections. See Steering Gear Adjustment. Check and correct. Grease spindles. See Lubricating the Tractor.</p>
Drive belt does not stop when clutch/brake pedal depressed.	<ol style="list-style-type: none"> <li>1. Belt stops or belt tension out of adjustment.</li> </ol>	<p>See Adjustments Section.</p>

## TROUBLESHOOTING THE MOWER

PROBLEM	CAUSE	REMEDY
Mower will not raise.	<ol style="list-style-type: none"> <li>1. Lift linkage not properly attached or damaged.</li> <li>2. Dirt in hydraulic lines.</li> <li>3. Brake pedal depressed.</li> </ol>	<p>Attach or repair.  Change hydraulic system filter. Release brake pedal to power transmission.</p>
Mower cut is uneven.	<ol style="list-style-type: none"> <li>1. Mower not leveled properly.</li> <li>2. Tractor tires not inflated equally or properly.</li> </ol>	<p>See Mower Adjustment. See Maintenance Section.</p>
Mower cut is rough looking.	<ol style="list-style-type: none"> <li>1. Engine speed too slow.</li> <li>2. Ground speed too fast.</li> <li>3. Blades are dull.</li> <li>4. Mower drive belt slipping because it is oily or worn.</li> <li>5. Check PTO (Electric Clutch) Adjustment.</li> <li>6. Blades not properly fastened to arbors.</li> </ol>	<p>Set to full throttle. Slow down. Sharpen or replace blades. See Mower Blade Service. Clean or replace belt as necessary.  See Adjustments Section.  See Servicing the Mower Blades.</p>
Engine stalls easily with mower engaged.	<ol style="list-style-type: none"> <li>1. Engine speed too slow.</li> <li>2. Ground speed too fast.</li> <li>3. Carburetor improperly adjusted.</li> <li>4. Cutting height set too low.</li> <li>5. Discharge chute jamming with cut grass.</li> <li>6. Engine not up to operating temperature.</li> <li>7. Starting mower in tall grass.</li> </ol>	<p>Set to full throttle. Slow down. See Engine Manual. Cut tall grass at maximum cutting height during first pass. Cut grass with discharge pointing toward previously cut area. Run engine for several minutes to warm-up.  Start the mower in a cleared area.</p>
Excessive mower vibration.	<ol style="list-style-type: none"> <li>1. Blade mounting screws are loose.</li> <li>2. Mower blades, arbors, or pulleys are bent.</li> <li>3. Mower blades are out of balance.</li> <li>4. Belt installed incorrectly.</li> </ol>	<p>Tighten to 45-55 ft.lbs. (61-75 N.m.).  Check and replace as necessary.  Remove, sharpen, and balance blades. See Servicing the Mower Blades. Reinstall Correctly.</p>
Excessive belt wear or breakage.	<ol style="list-style-type: none"> <li>1. Bent or rough pulleys.</li> <li>2. Using incorrect belt.</li> </ol>	<p>Repair or replace. Replace with correct belt.</p>
Mower drive belt slips or fails to drive.	<ol style="list-style-type: none"> <li>1. Idler pulley spring broken or not properly attached.</li> <li>2. Belt stops out of adjustment.</li> <li>3. Mower drive belt broken.</li> <li>4. PTO clutch out of adjustment.</li> </ol>	<p>Repair or replace as needed.  Check belt stops. Replace drive belt. Adjust PTO clutch.</p>

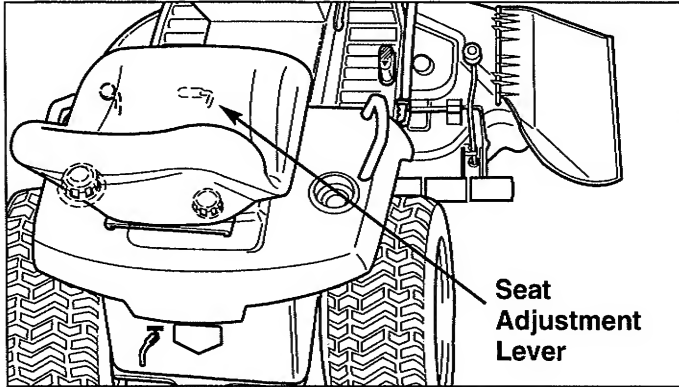


Figure 43. Seat Adjustment

### SEAT ADJUSTMENT

See Figure 43. The seat can be adjusted forward and back. Move the lever, position the seat as desired, and release the lever to lock the seat into position.

### STEERING WHEEL ADJUSTMENT

1. Use a suitable punch to remove the roll pin at the base of the steering wheel (see Figure 44).
2. Pull down on the rubber boot to expose the two holes in the steering shaft.
3. Align the hole in the steering wheel with the appropriate steering shaft hole and install the roll pin.

*NOTE: Steering wheel is factory installed with the roll pin in the bottom hole.*

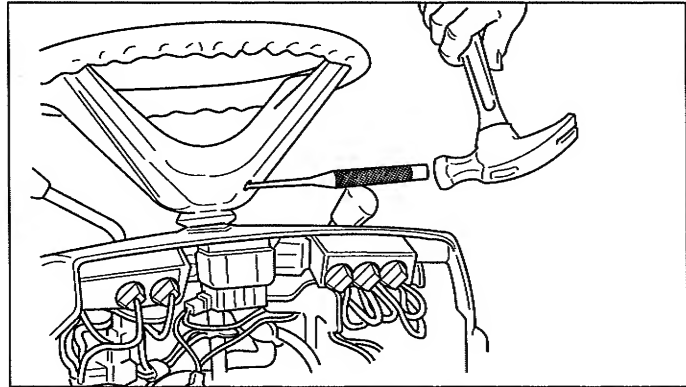


Figure 44. Steering Wheel Removal

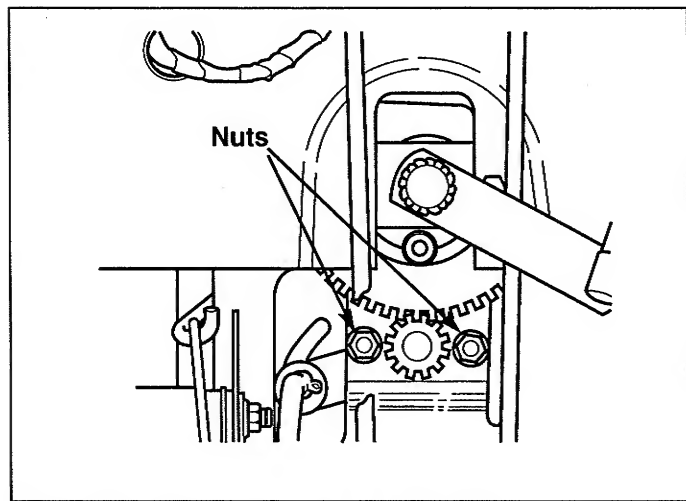


Figure 45. Steering Gear Adjustment

### STEERING GEAR ADJUSTMENT

If there is excessive slack in the steering system, the steering gear backlash can be removed.

1. See Figure 45. Loosen the two nuts and adjust the bracket so the gear teeth are closely meshed.
2. Tighten nuts after adjustment.

### BRAKE ADJUSTMENT

1. Disengage the PTO, stop the engine, block the wheels, remove the ignition key, and engage the parking brake.
2. Remove the mower deck (see Mower Deck Removal).
3. Locate the brake spring (A, Figure 46) and adjustment nut (B).
4. With the parking brake engaged, measure the compressed spring length. The spring should be 5-3/8" to 5-3/4" (13.7-14.6cm) when compressed.

If the spring is not within this range, turn the adjustment nut (B, Figure 46) to compress or release the spring.

**If this adjustment does not correct a braking problem, see your dealer.**

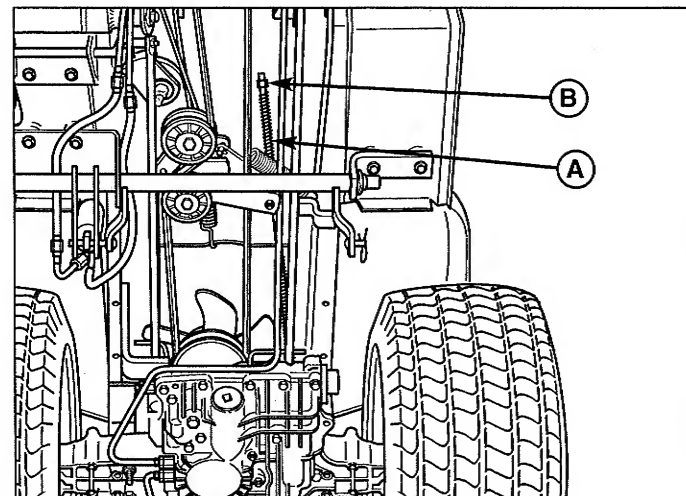
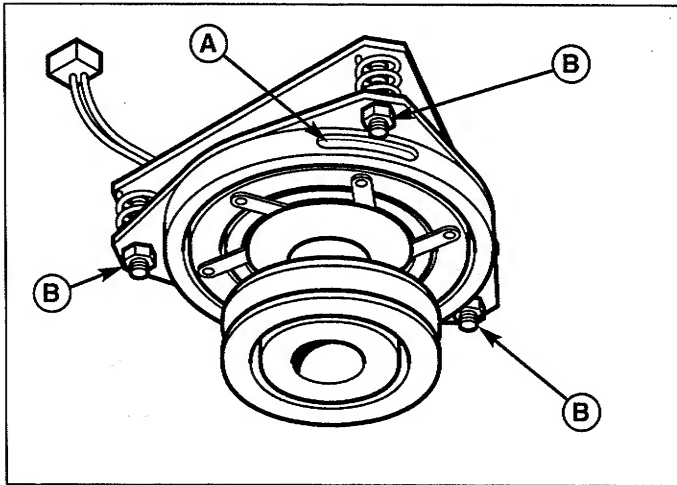


Figure 46. Brake Spring Adjustment

- A. Brake Spring
- B. Adjustment Nut



**Figure 47. PTO Clutch Adjustment**

- A. Adjustment Window (Qty. 3, one shown)
- B. Adjustment Nut

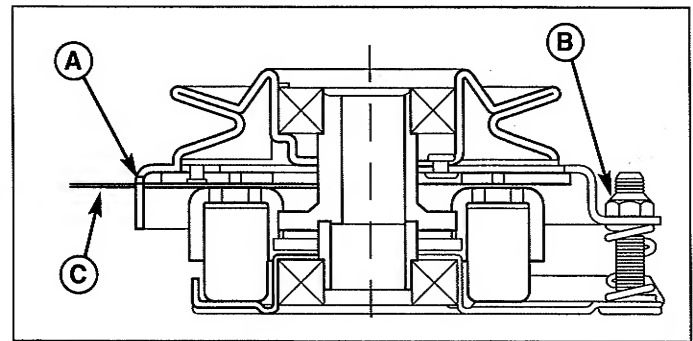
## PTO CLUTCH ADJUSTMENT

Check the PTO clutch adjustment after the initial 50 hour break-in period and then after every 250 hours of operation. Also perform the following procedure if the clutch is slipping or will not engage, or if a new clutch has been installed.

1. Remove key from ignition switch and disconnect spark plug wires to prevent the possibility of accidental starting while the PTO is being adjusted.
2. See Figure 47. Note the position of the 3 adjustment windows (A) in the side of the brake plate and the nylock adjustment nuts (B).
3. Insert a .012"-.015" (2.5-4mm) feeler gauge (C) through each window, positioning the gauge between the rotor face and the armature face as shown in Figure 48.
4. Alternately tighten the adjustment nuts (B, Figure 47) until the rotor face and armature face just contacts the gauge.
5. Check the windows for an equal amount of tension when the gauge is inserted and removed, and make any necessary adjustments by tightening or loosening the adjustment nuts.

**NOTE:** The actual air gap between the rotor and armature may vary even after performing the adjustment procedure. This is due to dimensional variations on component parts, and is an acceptable condition.

6. Check the mower blade stopping time. The mower blades and mower drive belt should come to a complete stop within five seconds after the electric PTO switch is turned off.



**Figure 48. Adjust PTO Clutch**

- A. Window
- B. Adjustment Nut
- C. Feeler Gauge

## ⚠ WARNING

**To avoid serious injury, perform adjustments only with engine stopped, key removed and tractor on level ground.**

## Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within five seconds after electric PTO switch is turned off.

1. With parking brake engaged, PTO disengaged and an operator in the seat, start the tractor engine.
2. Look over the left-hand footrest at the mower drive belt. Engage the PTO and wait several seconds. Disengage the PTO and check the amount of time it takes for the mower drive belt to stop.
3. If the mower drive belt does not stop within five seconds, perform the PTO Clutch Adjustment. If the belt still does not stop within 5 seconds, see your dealer.

## MOWER ADJUSTMENTS

### Deck Baffles (Select Models)

Deck baffles do not require assembly and should not be removed.

### Gauge Wheels (54" Models)

The mower gauge wheels can be placed in two positions depending on the height of cut. When using higher cutting heights, set the wheels in the lower position. When using lower cutting heights, set the wheels in the upper position. To adjust:

1. Remove the hair pin clip (A, B, Figure 49).
2. For upper position, install the pin (A) through the spindle above the bracket (C). For the lower position, push down on the top of the spindle, and install the hair pin clip (B) below the top of the bracket (C).

### Cutting Height Adjustment

The cutting height adjustment knob (A, Figure 50) controls the mower cutting height. The cutting height is infinitely adjustable between 1" (2.5cm) and 3-5/8" (9.2cm). Turn the knob clockwise to raise the deck and counter-clockwise to lower it.

### Leveling The Mower

If the cut is uneven, the mower may need leveling. Unequal or improper tire pressure may also cause an uneven cut. Make sure tire pressure is correct as specified in Checking Tire Pressure.

#### SIDE-TO-SIDE LEVELING

1. With the mower installed, place the tractor on a smooth, level surface such as a concrete floor. Turn the front wheels straight forward.
2. Check for bent blades and replace if necessary.
3. Place the mower in mid-cut position. Arrange the outside mower blades so that they are pointing from side-to-side.
4. Measure the distance between the outside tips of each blade and the ground. If there is more than 1/8" (3mm) difference between the measurements on each side, proceed to step 5. If the difference is 1/8" (3mm) or less, proceed to step 6.
5. See Figure 51. Loosen the outside nut (A). Turn the eccentric nut (B) to raise or lower left-hand side of mower. When mower is level, hold the eccentric nut while tightening the outside nut.

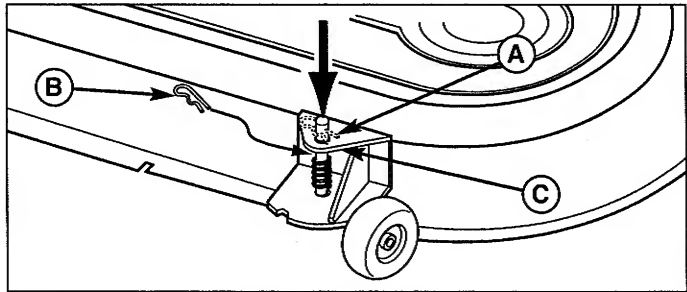
**NOTE:** 44" & 50" Mowers. When using a turbo collection system, raise the discharge side of the mower approximately 1/4" (6mm) to compensate for turbo assembly weight. Check the level of the cut grass and adjust the 1/4" (6mm) measurement as necessary for a smooth, even cut.

## ! WARNING

Before checking mower, shut off PTO and engine. Allow all moving parts to stop. Remove ignition key, then disconnect the spark plug wire and fasten it away from the spark plug.

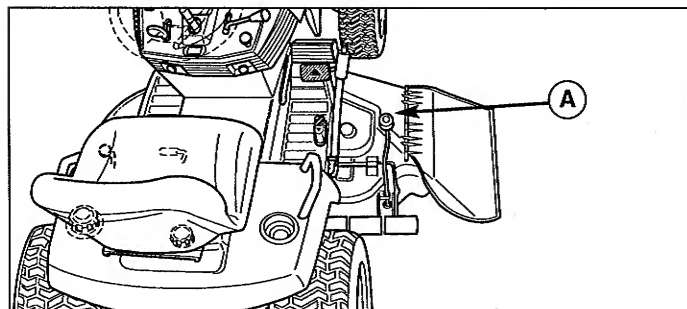
## ! CAUTION

On tractors equipped with liquid cooled engines, DO NOT remove the mower deck baffles. The baffles help prevent grass clippings from becoming airborne and plugging up the engine cooling grates. Plugged cooling grates can cause engine over-heating and create a potential fire hazard.



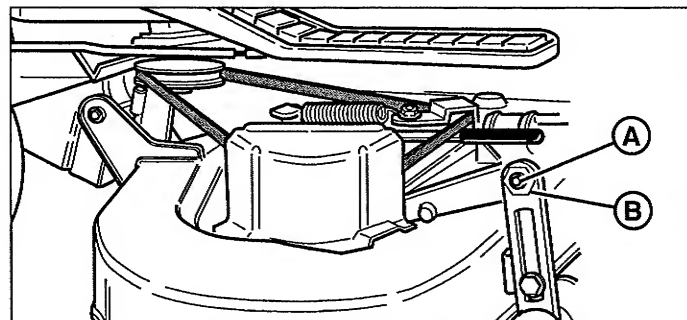
**Figure 49. Gauge Wheel Adjustment**

- A. Hair Pin (Upper Position)
- B. Hair Pin (Lower Position)
- C. Gauge Wheel Bracket



**Figure 50. Mower Cutting Height Adjustment**

- A. Adjustment Knob



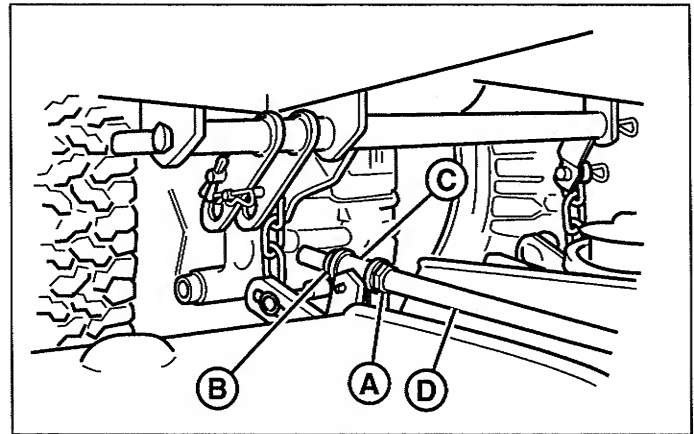
**Figure 51. Leveling The Mower Side-to-Side**

- A. Outside Nut
- B. Eccentric Nut

## FRONT-TO-BACK LEVELING

**NOTE:** 54" mowers have two adjustment rods (D, Figure 52) that should be adjusted simultaneously.

6. Arrange the blades so they face front-to-back.
7. Measure the distance from the ground to the front tip of the center blade, and from the ground to rear tips of left-hand and right-hand blades.  
Front tip of the center blade should be 1/4" (6mm) higher than rear tips of left-hand and right-hand blades. If not, proceed with steps 8 - 10.
8. See Figure 52. To raise front of mower deck, loosen front nut (A) and turn rear nut (B) against bracket (C).
9. To lower front of mower deck, loosen rear nut (B) and bracket (C) will move backwards to lengthen rod.
10. Re-check measurement before tightening front nut (A) against bracket.



**Figure 52. Leveling The Mower Front-To-Back**

- |              |                   |
|--------------|-------------------|
| A. Front Nut | C. Mower Bracket  |
| B. Rear Nut  | D. Adjustment Rod |

## TRANSMISSION DRIVE BELT REPLACEMENT

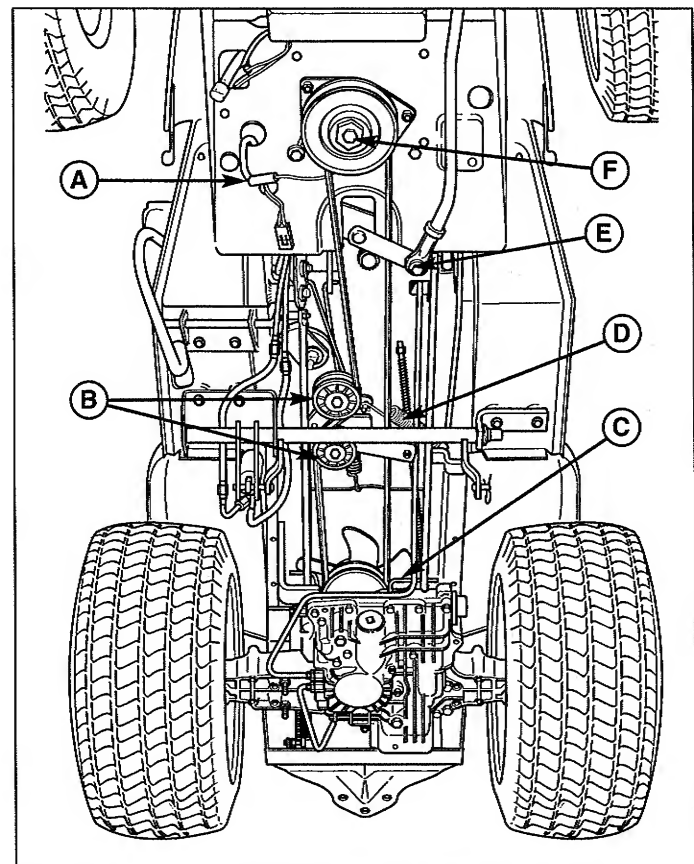
**NOTE:** Be sure to use only genuine Simplicity replacement parts. Check the back of this manual or the decal under the hood for common replacement part numbers.

### REMOVE THE OLD BELT

1. Turn off the PTO, stop the engine, block the tires, and engage the parking brake.
2. Remove the mower deck.
3. Remove the transmission belt guide (C, Figure 53).
4. Loosen the idler pulleys (B).
5. Disconnect the steering arm (E) from the drag link.
6. Unplug the PTO clutch electrical plug (A). Remove the capscrew (F) securing the PTO clutch to the crankshaft. Remove the clutch.
7. Remove the drive belt from the engine pulley, idler pulleys, and transmission input pulley.

### INSTALL THE NEW BELT

8. Install a new drive belt on the transmission input pulley and engine drive pulley.
9. Install the PTO clutch using the original hardware. Torque the crankshaft bolt (F) to 45-50 ft lbs (61-67Nm).
10. Install the drive belt in the idler assembly pulleys (B). Tighten the pulley hardware.
11. Install the transmission belt guide (C).
12. Release the parking brake. Check that the belt has been routed correctly and that all adjustable belt guides are adjusted to within 1/8" (3.2mm) of the belt guide.
13. Reconnect the steering arm (E) and drag link. Coat the steering arm capscrew with thread locking compound and torque to 17-23 ft. lbs (23-31Nm).



**Figure 53. Transmission Drive Belt Replacement**

- |                      |                       |
|----------------------|-----------------------|
| A. PTO Clutch Plug   | D. Idler Assy. Spring |
| B. Idler Pulleys     | E. Steering Arm       |
| C. Trans. Belt Guide | F. Crankshaft Bolt    |

## MOWER BELT REPLACEMENT



To avoid damaging belts, DO NOT PRY BELTS OVER PULLEYS.

### 44" & 50" PTO Belt Replacement

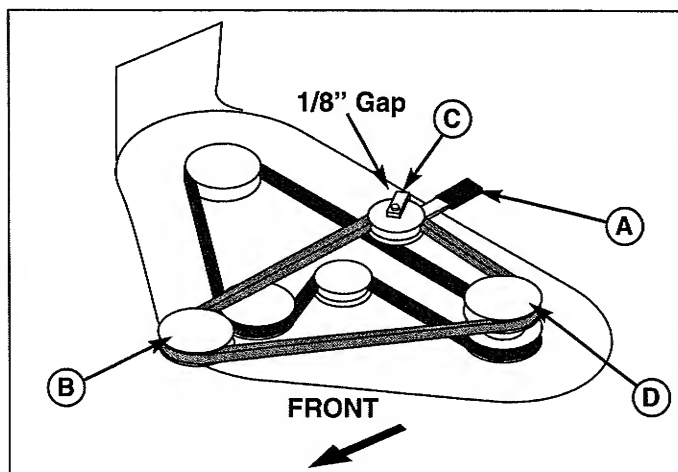
1. Park the tractor on a smooth, level surface such as a concrete floor. Disengage the PTO, turn off the engine and lock the parking brake. Remove the key. Remove the mower or place in the lowest cutting position.
2. Move the idler arm (A, Figure 54) to relieve belt tension. Drop the belt from the PTO (electric clutch) pulley.

**IMPORTANT:** Note the position of all belt guides relative to the belt and pulleys before loosening.

3. Loosen the nut and lockwasher securing idler pulley belt guide (C, Figure 54).
4. See Figure 55. Remove three capscrews securing left-hand arbor cover (D).
5. Remove the old belt and replace with a new one. Make sure the V-side of belt runs in the pulley grooves.
6. See Figure 54. Position the idler pulley belt stop (C) in its original position so that there is a 1/8" (3mm) gap between the pulley and belt stop.
7. See Figure 55. Reinstall the left-hand arbor cover (D). Reinstall the mower deck if removed.
8. Run the mower under a no-load condition for about 5 minutes.

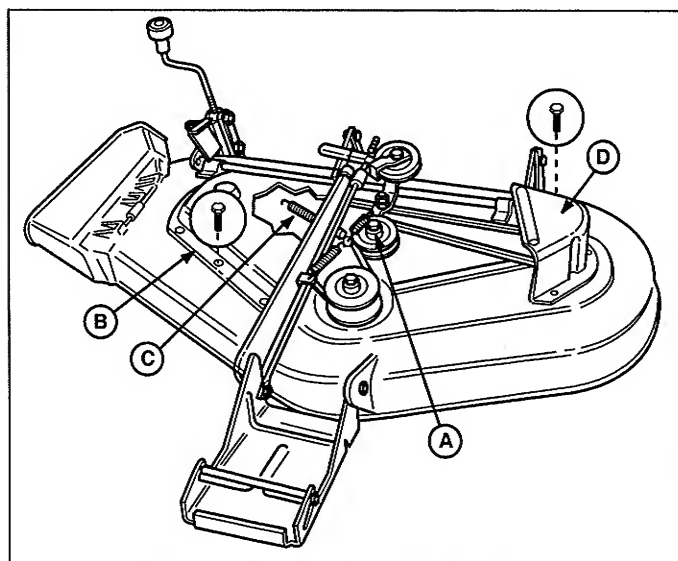
### 54" PTO Belt Replacement

1. Park the tractor on a smooth, level surface such as a concrete floor. Disengage the PTO, turn off the engine and lock the parking brake. Remove the key.
2. Move the idler arm (A, Figure 54) to relieve belt tension. Drop the belt from the PTO (electric clutch) pulley.
3. Remove the old belt and replace with a new one. Make sure the V-side of belt runs in the pulley grooves.
4. Install the drive belt on the PTO pulley. Move the idler arm and install the belt on the idler pulley.
5. Run the mower under no-load condition for about 5 minutes.



**Figure 54. Mower Belt Routing**

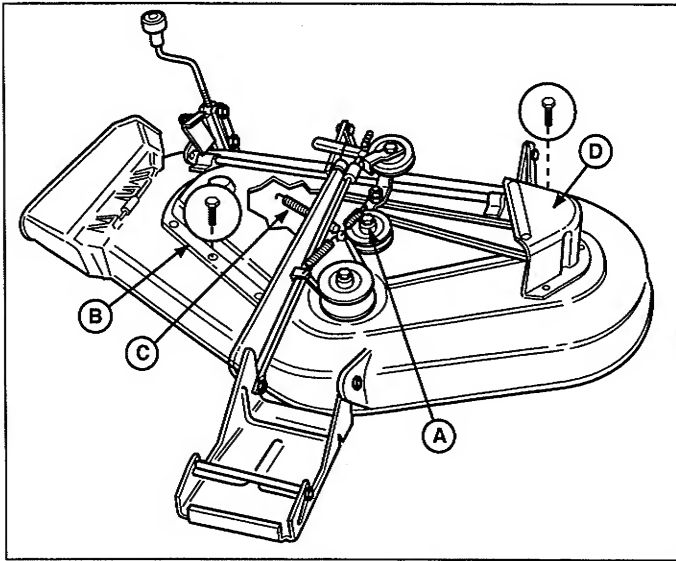
- |                      |                                |
|----------------------|--------------------------------|
| A. Idler Pulley Arm  | C. Belt Guide (44" & 50" Only) |
| B. PTO Clutch Pulley | D. Arbor Drive Pulley          |



**Figure 55. Mower Deck - 44" & 50" Mowers**

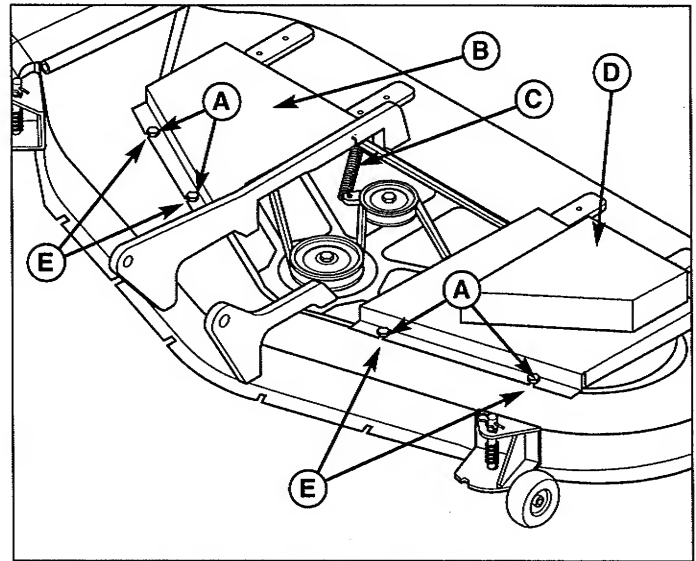
- |                           |
|---------------------------|
| A. Capscrew               |
| B. Right-hand Arbor Cover |
| C. Spring                 |
| D. Left-hand Arbor Cover  |





**Figure 56. Mower Deck - 44" & 50" Mowers**

- A. Capscrew
- B. Right-hand Arbor Cover
- C. Spring
- D. Left-hand Arbor Cover



**Figure 57. Mower Deck - 54" Mowers**

- A. Taptite Screws
- B. Right-hand Arbor Cover
- C. Spring
- D. Left-hand Arbor Cover
- E. Alignment Notches

## Arbor Drive Belt Replacement - All Models

**NOTE:** Be sure to use only genuine Simplicity replacement parts.

1. Park the tractor on a smooth, level surface such as a concrete floor. Disengage the PTO, turn off the engine and lock the parking brake. Remove the key.
2. Remove the mower from the tractor. See Mower Removal in the Operation section.

### 44" & 50" MODELS

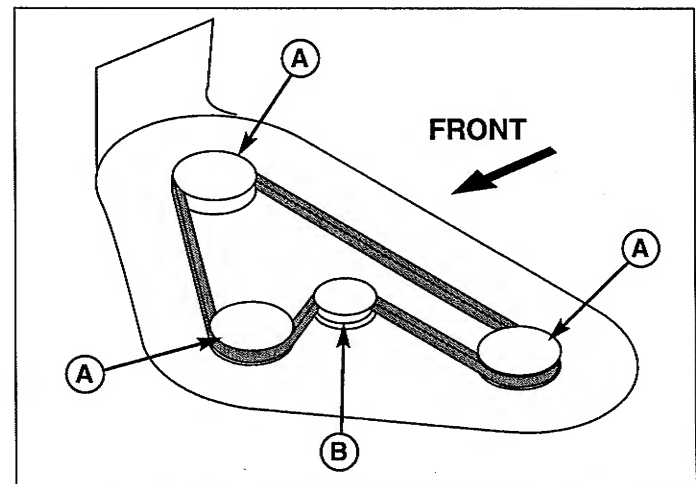
3. Remove the capscrews securing the right-hand arbor cover (B, Figure 56). Remove three capscrews securing left-hand arbor cover (D).

### 54" MODELS

3. Remove the PTO belt. Remove the taptite screws (A, Figure 57) securing the belt covers and remove the belt covers (B, D).

### ALL MODELS

4. Using a pair of locking pliers or a spring puller, remove the idler pulley spring (C, Figures 56, 57) from slot in deck.
5. Loosen capscrew (A, Figure 55) securing the idler pulley to the bracket. The belt can now be slipped between the pulley and idler bracket hub.
6. Install a new belt as shown in Figure 58. Make sure that V-side of belt runs in arbor pulley (A) grooves and flat side of belt runs against idler pulley (B).
7. Tighten the capscrew (A, Figure 55).
8. Reinstall spring (C, Figures 56, 57) into its slot in mower deck.



**Figure 58. Mower Deck Drive Belt Routing All Models**

- A. Arbor Drive Pulley (V-sided)
- B. Idler Pulley (Flat-sided)

9. Reinstall the left and right arbor covers (B and D, Figures 56, 57). **54" Models:** To provide proper belt cover clearance, make sure the alignment notches (E, Figure 57) are centered on the taptite screws (A).
10. Install the mower onto the tractor.

## BATTERY SERVICE

### WARNING

Keep open flames and sparks away from the battery; the gasses coming from it are highly explosive. Ventilate the battery well during charging.

### Checking Battery Voltage

A voltmeter can be used to determine condition of battery. When engine is off, the voltmeter shows battery voltage, which should be 12 volts. When engine is running, the voltmeter shows voltage of charging circuit which normally is 13 to 14 volts.

A dead battery or one too weak to start the engine may not mean the battery needs to be replaced. For example, it may mean that the alternator is not charging the battery properly. If there is any doubt about the cause of the problem, see your dealer. If you need to replace the battery, follow the steps under Cleaning the Battery & Cables in the Regular Maintenance Section.

### Charging a Completely Discharged Battery

### WARNING

Do not attempt to charge a frozen battery. Allow the battery to warm to 60° F (15.5° C) before placing on charger.

1. Be aware of all the safety precautions you should observe during the charging operation. If you are unfamiliar with the use of a battery charger and hydrometer, have the battery serviced by your dealer.
2. Add water sufficient to cover the plate (fill to the proper level near the end of the charge). If the battery is extremely cold, allow it to warm before adding water because the water level will rise as it warms. Also, an extremely cold battery will not accept a normal charge until it becomes warm.
3. Always unplug or turn the charger off before attaching or removing the clamp connections.
4. Carefully attach the clamps to the battery in proper polarity (usually red to [+] positive and black to [-] negative).
5. While charging, periodically measure the temperature of the electrolyte. If the temperature exceeds 125° F (51.6° C), or if violent gassing or spewing of electrolyte occurs, the charging rate must be reduced or temporarily halted to prevent battery damage.
6. Charge the battery until fully charged (i.e. until the specific gravity of the electrolyte is 1.250 or higher and the electrolyte temperature is at least 60° F). The best method of making certain a battery is fully charged, but not over charged, is to measure the specific gravity of a cell once per hour. The battery is fully charged when the cells are gassing freely at low charging rate and less than 0.003 change in specific gravity occurs over a three hour period.

### Jump Starting With an Auxiliary (Booster) Battery

Jump starting is not recommended. However, if it must be done, follow these directions. Both booster and discharged batteries should be treated carefully when using jumper cables. Follow the steps below EXACTLY, being careful not to cause sparks. Refer to Figure 59.

1. Both batteries must be of the same voltage.
2. Position the vehicle with the booster battery adjacent to the vehicle with the discharged battery so that booster cables can be connected easily to the batteries in both vehicles. Make certain vehicles do not touch each other.
3. Wear safety glasses and shield eyes and face from batteries at all times. Be sure vent caps are tight. Place damp cloth over vent caps on both batteries.
4. Connect positive (+) cable to positive post of discharged battery (wired to starter or solenoid).
5. Connect the other end of same cable to same post marked positive (+) on booster battery.
6. Connect the second cable negative (-) to other post of booster battery.
7. Make final connection on engine block of stalled vehicle away from battery. Do not lean over batteries.
8. Start the engine of the vehicle with the booster battery. Wait a few minutes, then attempt to start the engine of the vehicle with the discharged battery.
9. If the vehicle does not start after cranking for thirty seconds, STOP PROCEDURE. More than thirty seconds seldom starts the engine unless some mechanical adjustment is made.
10. After starting, allow the engine to return to idle speed. Remove the cable connection at the engine or frame. Then remove the other end of the same cable from the booster battery.
11. Remove the other cable by disconnecting at the discharged battery first and then disconnect the opposite end from the booster battery.
12. Discard the damp cloths that were placed over the battery vent caps.

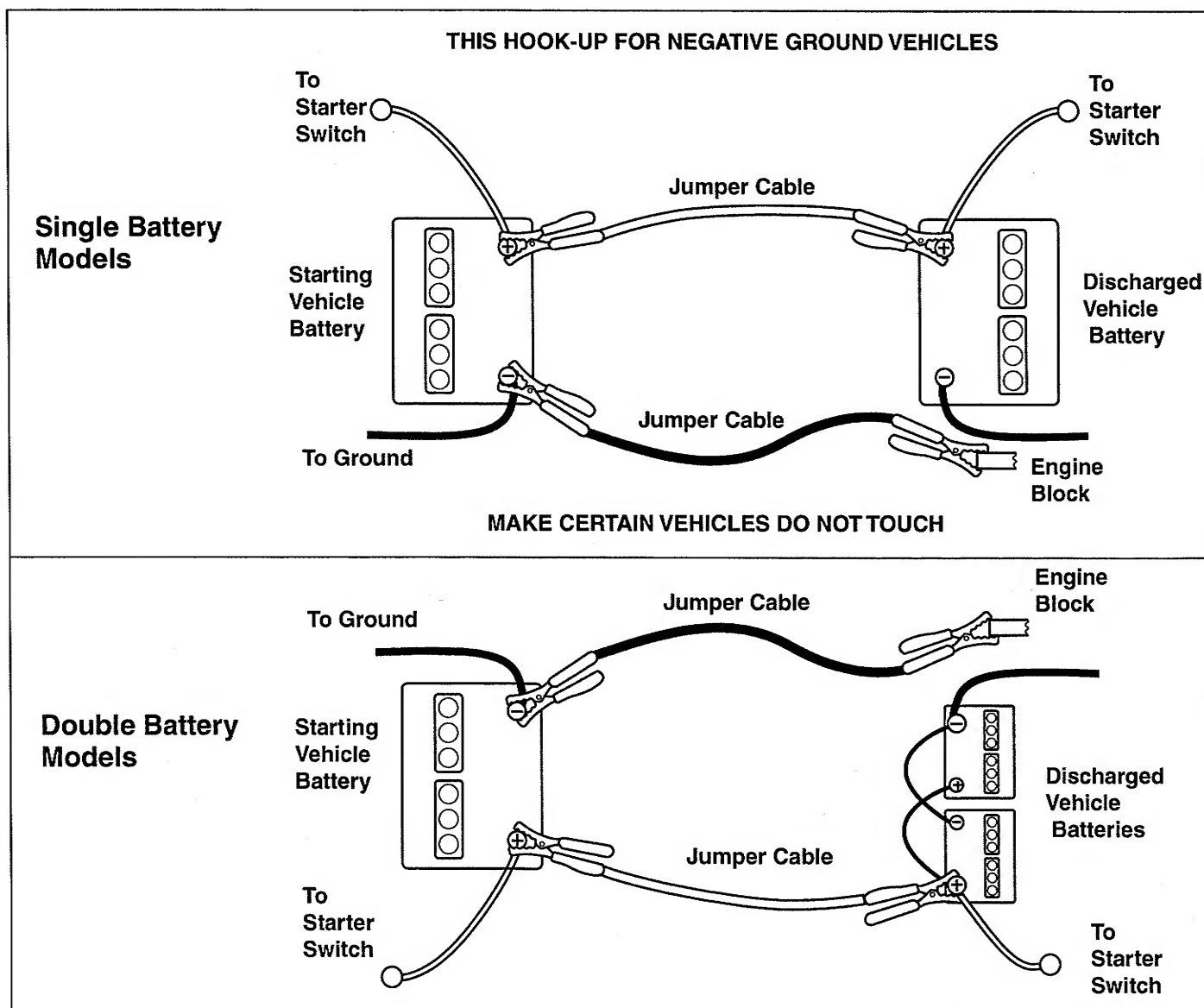


Figure 59. Battery Jump Starting Diagram

## ⚠ WARNING

Any procedure other than the preceding could result in:

- (1) personal injury caused by electrolyte squirting out the battery vents,
- (2) personal injury or property damage due to battery explosion,
- (3) damage to the charging system of the booster vehicle or of the immobilized vehicle.

Do not attempt to jump start a vehicle having a frozen battery because the battery may rupture or explode. If a frozen battery is suspected, examine all fill vents on the battery. If ice can be seen or if the electrolyte fluid cannot be seen, do not attempt to start with jumper cables as long as the battery remains frozen.

## ⚠ WARNING

For your personal safety, use extreme care when jump starting. Never expose battery to open flame or electric spark – battery action generates hydrogen gas which is flammable and explosive. Do not allow battery acid to contact skin, eyes, fabrics, or painted surfaces. Batteries contain a sulfuric acid solution which can cause serious personal injury or property damage.

When removing or installing battery cables, disconnect the negative cable **FIRST** and reconnect it **LAST**. If not done in this order, the positive terminal can be shorted to the frame by a tool.

To avoid engine damage, do not disconnect bat-

# Specifications



NOTE: Specifications are correct at time of printing and are subject to change without notice.

## ENGINE:

### 23 HP Kohler

Make	Kohler
Model	CV23S
Horsepower	23 HP @ 3600 rpm
Cylinders	2
Bore	3.15 in (80 mm)
Stroke	2.64 in (67 mm)
Displacement	41.1 Cu. in (674 cc)
Construction	Overhead Valve, Cast-Iron Sleeves, Aluminum Crankcase
Electrical System	12 Volt, 15 amp Alternator Regulated
Battery	340 Cold Cranking amps, 41 Min. Reserve Capacity
Ignition	Industrial Rated Starter Motor
Air Cleaner	Electronic Ignition
	Ducted Paper Cartridge and Foam Pre-cleaner
Lubrication	Full Pressure Lube w/ Oil Filter & Cooler
Oil Capacity	2 qt w/Filter (1.9 L)
Muffler	Quiet Compact, Low Back Pressure

### 20 HP Briggs & Stratton Vanguard

Make	Briggs & Stratton
Model	Vanguard™ V-Twin
Horsepower	20 HP/18HP @ 3600 rpm
Cylinders	2
Bore	2.83 in (72 mm)
Stroke	2.75 in (70 mm)
Displacement	34.75 Cu. in (570 cc)
Construction	Overhead Valve, Cast-Iron Sleeves, Aluminum Crankcase
Electrical System	12 Volt, 16 amp Alternator Regulated
Battery	340 Cold Cranking amps, 41 Min. Reserve Capacity
Ignition	Industrial Rated Starter Motor
Air Cleaner	Magnetron Electronic Ignition
	Ducted Paper Cartridge and Foam Pre-cleaner
Lubrication	Large 325 sq. in Air Filtering System
Oil Capacity	Full Pressure Lube w/ Oil Filter
Muffler	56 oz. w/Filter (1.7 L)
	Quiet Compact, Low Back Pressure

### 18 HP Briggs & Stratton Vanguard

Make	Briggs & Stratton
Model	Vanguard™ V-Twin
Horsepower	18HP @ 3600 rpm
Cylinders	2
Bore	3.03 in (77 mm)
Stroke	2.64 in (67 mm)
Displacement	38 Cu. in (624 cc)
Construction	Overhead Valve, Cast-Iron Sleeves, Aluminum Crankcase
Electrical System	12 Volt, 16 amp Alternator Regulated
Battery	340 Cold Cranking amps, 41 Min. Reserve Capacity
Ignition	Industrial Rated Starter Motor
Air Cleaner	Magnetron Electronic Ignition
	Ducted Paper Cartridge and Foam Pre-cleaner
Lubrication	Full Pressure Lube w/ Oil Filter
Oil Capacity	2 Quarts w/Filter (1.9 L)
Muffler	Quiet Compact, Low Back Pressure

### 17HP Kawasaki

Make	Kawasaki
Model	FD 501V
Horsepower	17 HP @ 3600 rpm
Cylinders	2
Bore	2.64 in (67 mm)
Stroke	2.44 in (62 mm)
Displacement	26.7 Cu. in (437 cc)
Construction	Liquid Cooled, Overhead Valve, Cast-Iron Sleeves, Aluminum Crankcase, and connecting Rods, Full Pressure Oil Lubrication
Coolant	2.2 Quarts 50/50
Electrical System	Mix: Water / Ethylene Glycol
Battery	12 Volt, 20 amp Alternator Regulated.
	(2) 380 Cold Cranking amps, 45 Min. Reserve
Ignition	Industrial Rated Starter Motor
Air Cleaner	Electronic Ignition
Lubrication	Ducted Paper Cartridge
Oil Capacity	Full Pressure Lube w/ Oil Filter
Muffler	3.2 Pints w/Filter (1.5 L)
	Quiet Compact, Low Back Pressure

## TRANSMISSION:

Type	K71 Tuff Torq
Pump	Variable Displacement Axial Piston
Motor	Fixed Displacement Reversible Axial Piston
Hydraulic Fluid	1.2 Gallons (4.6L) 10W30 CD Oil, not including Oil Reservoir and External 10 Micron Filter
Control	Foot Control, Free-Wheeling Lever for Manual Tractor Movement, Continuously Variable, Forward & Reverse, without Braking or Gear Changing
Speeds @ 3400 rpm	Forward: 0 - 6.6 MPH (0 - 10.6 km/h)
Differential	Reverse: 0 - 3.1 MPH (0 - 5 km/h)
Axle Shaft	Bevel Gear Type with Controlled Traction
Continuous Torque Output	1 in
Drawbar Rating	405 ft. lbs.
Maximum Weight on Axle	440 lbs.
	728 lbs.

## CHASSIS:

Frame	Heavy Steel Channel 10/12 Gauge
	Power Take-Off Point: Front
	Engine Mounting: Above Front Axle
	Pivot Point Location: Front Axle
	Front Steel Bumper
Rear Wheels	Tire Size: 23 x 10.50-12 Turf Type
	Pneumatic Inflation Pressure: 6-8 psi (41-55 kPa)
Front Axle	1-3/4 in x 3 in 12 Ga. Fabricated Tube
Front Wheels	Tire Size: 16 x 6.50-8 Turf Type
	Pneumatic Inflation Pressure: 12-15 psi (82-103 kPa)
	Tapered Roller Bearings
Accessibility	Hood Tips Forward
Seat	Type: Bucket, High Back w/Quick Adjust, Spring Suspension, Optional Armrests
Turning Radius	Inside Rear Tire: 24 in (61 cm)
Fuel Tank	Material: Non-Corrosive Polyethylene, Wide Fill Cap
	Capacity: 4.25 Gallons (16.1 L)

## CONTROLS:

Steering	15" (38 cm) Steering Wheel, Gear and Sector, 1.25 turns lock to lock Power Steering (Standard on 20HP Models, Optional on 18HP & 17HP Models)
Clutch/ Brake Pedal	Location: Right Front Combination Clutch/Brake/ Parking Brake Pedal
Location	Mower Lift Lever: on Dash PTO Clutch: Electric, Dash Mounted Drive: Foot Controlled Forward/Reverse Ignition Key Switch: On Lower Dash Panel Throttle Lever Top of Dash Panel and Choke Knob On Lower Dash Panel Light Switch: On Dash Panel Separate Indicator Lights for Safety Interlock Switch: PTO Engaged, Low Oil Pressure Warning Light, Cruise Control Engaged, & Engine Coolant Overheat (Liquid Cooled Models Only)

## DIMENSIONS:

Overall Length	75.25 in (191 cm)
Overall Width	39 in (99.1 cm)
Height	To Top of Steering Wheel: 42.5 in (108 cm) To Top of Engine Cover: 36 in (91.4 cm) 52.25 in (132.7 cm)
Wheel Base	
Weights:	
20HP Tractor	Net: 560 lbs.
18HP Tractor	Net: 558 lbs.
17HP Tractor	Net: 557 lbs.
50" Mower Deck	Net: 125 lbs.
44" Mower Deck	Net: 112 lbs.
Shipping Weight	Add Apx. 140 lbs. for Crate
Tractor Height w/Snowcab	73 in (185 cm)
Tractor Length w/Snowthrower	101 in (256 cm)
Tractor Length w/Snowthrower & Rear weight carrier	118 in (299 cm)
Tractor Length w/Tiller	101 in (256 cm)
Tractor Length w/Dozer Blade	est. 97 in (246 cm)

## MOWER DECKS

### 54" Deck

Deck Construction	10 Ga.
Effective Cutting Width	54 in (137 cm)
Overall Width with Deflector	65 in (165 cm)
Overall Width with Turbo	65 in (165 cm)
Weight	180 lbs. (81 kg)
Variable Cutting Ht.	1 in - 3.6 in (2.54cm to 9.1cm)
Blade Arrangement	Three Staggered Blades
Mower Drive	V-Belt From Engine PTO Electric Clutch
Spindle Bearings	Lubricated and Sealed Ball Bearings Lube Fitting Provided

### 50" Deck

Deck Construction	12 Ga.
Effective Cutting Width	50 in (127 cm)
Overall Width with Deflector	62 in (157.5 cm)
Overall Width with Turbo	64 in (162.5 cm)
Weight	125 lbs. (57 kg)
Variable Cutting Ht.	1.0 in - 3.6 in (2.5 to 9.1 cm)
Blade Arrangement	Three Staggered Blades
Mower Drive	V-Belt From Engine PTO Electric Clutch
Spindle Bearings	Lubricated and Sealed Ball Bearings Lube Fitting Provided

### 44" Mower Deck

Deck Construction	12 Ga.
Effective Cutting Width	44 in (111.8 cm)
Overall Width with Deflector	56 in (142.2 cm)
Overall Width with Turbo	58 in (147 cm)
Weight	112 lbs. (51 kg)
Variable Cutting Ht.	1.0 in - 3.6 in (2.5 to 9.1 cm)
Blade Arrangement	Three Staggered Blades
Mower Drive	V-Belt From Engine PTO Electric Clutch
Spindle Bearings	Lubricated and Sealed Ball Bearings Lube Fitting Provided

# Lawn Care & Mowing Information

## MOWING METHODS

### Proper Broadcast Mowing

Broadcasting, or side-discharging, disperses fine clippings evenly over the entire lawn. Many golf courses use this method. Your mower has a deep dish deck to allow freer circulation of clippings so they are broadcast evenly over the lawn.

#### ENGINE SPEED & GROUND SPEED FOR BROADCASTING

Always operate the engine at full throttle when mowing. If you hear the engine slowing down, you are mowing too fast—using a slower ground speed will improve the cutting efficiency of the blades and prevents many common cutting problems.

**ALWAYS** use an appropriate ground speed for the thickness and height of the grass you are cutting (3rd gear or slower for manual gear models). If you hear the engine



slowing down you are mowing too fast, use a slower ground speed.

#### HOW MUCH GRASS TO CUT OFF WHEN BROADCASTING

Mow when the grass is 3-5 inches long. Do not cut the grass shorter than 2 to 2-1/2 inches. Do not cut off more than 1 inch of grass in a single pass.

### Proper Mulching

Mulching consists of a mower deck which cuts and recuts clippings into tiny particles and which then blows them down INTO the lawn. These tiny particles decompose rapidly into by-products your lawn can use.

**UNDER PROPER CONDITIONS**, your mulching mower will virtually eliminate noticeable clippings on the lawn surface.

**NOTE:** When mulching under heavy cutting conditions, a rumbling sound may be present and is normal.

#### MULCHING REQUIRES EXCELLENT MOWING CONDITIONS

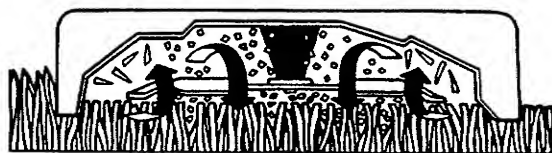
Mulching mowers cannot function properly if the grass is wet, or if the grass is simply too high to cut. Even more than normal mowing, mulching requires that the grass be dry and the appropriate amount is cut.

Do not use the mower as a mulching mower during the first two or three mowings in the spring. The long grass blades, quick growth, and often wetter conditions are more suitable for broadcasting (side-discharging) or grass bagging operation.

#### ENGINE SPEED & GROUND SPEED FOR BROADCASTING

Use full engine throttle matched with a slow ground speed so that clippings will be finely cut. Ground speed while mulching should be **HALF** of the speed that would be used when broadcasting (side discharging) under similar conditions. Since mulching requires more horsepower than broadcasting, using a slower ground speed is vitally important for proper mulching operation.

Mulching Action



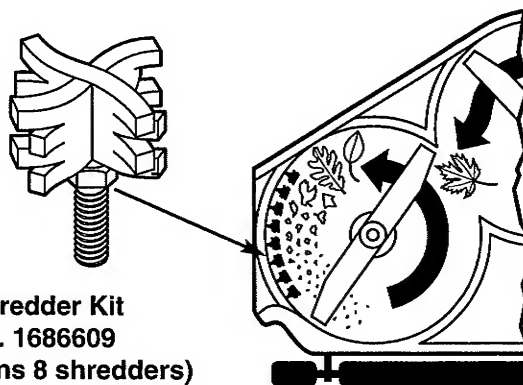
#### HOW MUCH GRASS TO MULCH

The best mulching action typically results from cutting only the top 1/2 inch to 3/4 inch of grass blade. This provides short clippings which decompose properly (much more quickly than longer clippings). The ideal cutting

height will vary with climate, time of year, and quality of your lawn. We recommend that you experiment with both the cutting height and ground speed until you achieve the best cut. Start with a high cutting height and using progressively lower settings until you find a cutting height that is matched to your mowing conditions and preferences.

#### LEAF SHREDDING (USE WITH OPTIONAL MULCHER KIT)

Simplicity's patented Shredder Blades virtually eliminate raking leaves. Up to 512 cutting edges pulverize leaves into tiny particles, which quickly and naturally decompose into food for your lawn. The Shredder Blades must be removed when you mulch grass clippings.



Leaf Shredder Kit  
Part No. 1686609  
(Contains 8 shredders)

### TIPS On Dealing With Clippings

Clippings are **beneficial** to your lawn. A common misconception about clippings is that they automatically lead to thatch—this is untrue. Short clippings produced by broadcasting and clippings produced by mulching methods actually **contribute to a healthy lawn** because they:

- ✗ Reduce the evaporation of water from your lawn.
- ✗ Provide a cushioning layer to reduce lawn wear.
- ✗ Moderate soil temperature.
- ✗ Clippings act as a safe, non-polluting and inexpensive fertilizer that nourishes your lawn. Fresh cut grass blades are 85% water, and are a rich source of nitrogen which is essential to lush growth. And one garbage bag of clippings contains about 1/4 lb. of usable organic nitrogen.

### COMPOSTING

The best way to recycle excess clippings and leave your lawn looking immaculate is to collect them with an efficient collection system and deposit them in a compost pile. A compost pile is a collection of grass, leaves, and other organic wastes which—when properly tended—decompose into an odorless, topsoil material. This material, in turn, acts as an inexpensive fertilizer for your lawn and garden.

#### How to start a healthy compost pile:

- 1 Build a bin using bricks, fencing, cement blocks, etc. or purchase a prefabricated bin from a garden store. The bin should also have venting on each side and from the bottom to the top.

- 2 Fill the bin with alternating layers of yard waste. Follow this recipe:

First layer: 3-4 inches of chopped brush or other coarse material.

Second layer: 6-8 inches of mixed leaves, grass clippings, sawdust, etc. Materials should be "sponge damp."

Third layer: 1 inch of soil to add micro-organisms that help break down organic matter.

Fourth layer: 1-2 inches of manure to provide the nitrogen needed by micro-organisms.

Keep adding layers until the bin is almost full. Top off with a 4-6 inch layer of straw and scoop out a "basin" to catch rain water.

- 3 Four or five days later the pile will reach temperatures of 140-160 degrees. At this time you'll notice it settling, a good sign your compost is working properly.
- 4 After 5-6 weeks, fork materials into a new pile, turning the outside of the old heap into the center of the new one. Add water if necessary. The compost should be ready to use within three to four months when dark brown, crumbly, and earthy-smelling.





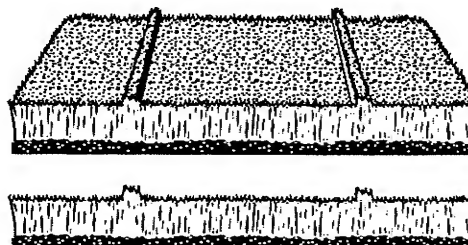
# Lawn Care & Mowing Information

## SOLUTIONS FOR COMMON MOWING PROBLEMS

### Streaking

Streaking is when thin strips of uncut grass are left behind the mower. Streaking is usually caused by operator error or poor blade maintenance.

### Streaking



#### CAUSE

Blades are not sharp  
Blades are worn down too far  
Engine speed is too slow  
Ground speed is too fast  
Deck is plugged with grass  
Not overlapping cutting rows enough  
Not overlapping enough when turning

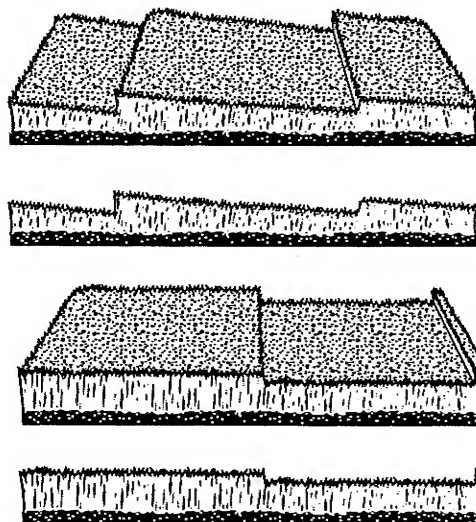
#### SOLUTION

Sharpen your blades  
Replace your blades  
Always mow at full throttle  
Slow down  
Clean out the mower  
Overlap your cutting rows  
When turning your effective cutting width decreases—overlap more when turning

### Stepped Cutting

Stepped cutting is sharp ridges or uneven levels left in the lawn surface. Stepped cutting is usually caused by mower deck damage or misadjustment, or damage to mower blades.

### Stepped Cutting



#### CAUSE

Deck is not leveled correctly  
Tires are not properly inflated  
Blades are damaged  
Deck shell is damaged  
Mower spindle is bent or loose  
Blades are installed incorrectly

#### SOLUTION

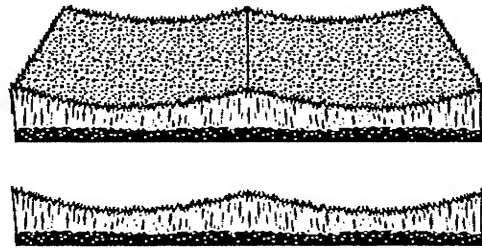
Level the deck correctly  
Check and inflate the tires  
Replace the blades  
Repair or replace the deck  
Repair or replace the spindle  
Reinstall the blades correctly

# Lawn Care & Mowing Information

## Uneven Cutting

Uneven cutting is waviness or smooth troughs in the lawn surface. Uneven cutting is usually caused by mower deck damage or misadjustment.

## Uneven Cutting



### CAUSE

Deck is not leveled correctly
Blades are dull or worn
Blades are damaged
Deck is clogged with grass clippings
Deck shell is damaged
Mower spindle is bent or loose
Blades are installed incorrectly

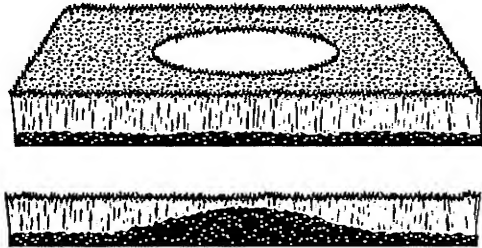
### SOLUTION

Level the deck correctly
Sharpen or replace the blades
Replace the blades
Clean out the deck
Repair or replace the deck
Repair or replace the spindle
Reinstall the blades correctly

## Scalping

Scalping is when the mower deck comes close to or hits the ground. Scalping can be caused by the mower deck misadjustment, unevenness in the lawn, or by mower deck bouncing because the ground speed is too fast.

## Scalping



### CAUSE

Lawn is uneven or bumpy
Mower deck cutting height is set too low
Ground speed is too fast
Deck is not leveled correctly
Tire pressure is low or uneven

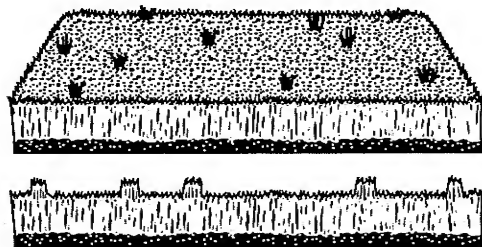
### SOLUTION

Roll or level the lawn
Raise the cutting height
Slow down
Correctly level the deck
Check and inflate the tires

## Stingers

Stingers are sparse patches of uncut grass left behind the mower. Stingers are usually caused by operator error or poor blade maintenance.

## Stingers



### CAUSE

Blades are not sharp or are nicked
Blades are worn down too far
Engine speed is too slow
Ground speed is too fast
Deck is plugged with grass

### SOLUTION

Sharpen your blades
Replace your blades
Always mow at full throttle
Slow down
Clean out the mower

## Common International Symbols



Choke



Fast (Throttle)



Slow (Throttle)



Throttle



Fuel



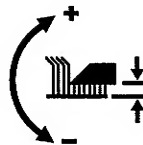
PTO Clutch



Parking Brake



Brake



Mower Cutting  
Height Adjustment



Headlights

## Technical Manuals

### Additional Technical Literature Available

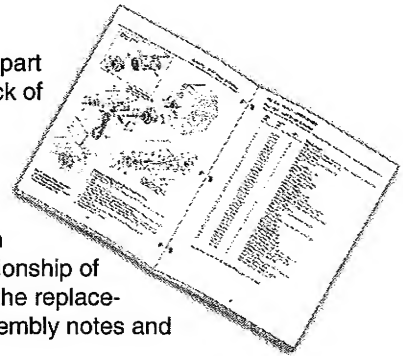


#### **Operators Manuals**

Additional copies of this manual are available, (and as part of our product support commitment, we maintain a stock of printed operators manuals going back many years!)

#### **Parts Manuals**

Fully illustrated parts manuals are also available — these manuals show all of the product's components in exploded views ("3D" illustrations which show the relationship of the parts and how they go together), as well as giving the replacement part numbers and quantities used. Important assembly notes and special torque values are included in these manuals.



For the applicable manuals currently available for your model, contact our Customer Publications Department at 262-284-8519. Have the information listed in the box at the right available when phoning in your request.

**Please allow 3 to 4 weeks for delivery.**



**Model:** \_\_\_\_\_

**Mfg. No.:** \_\_\_\_\_

**Your Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**City, State, Zip:** \_\_\_\_\_

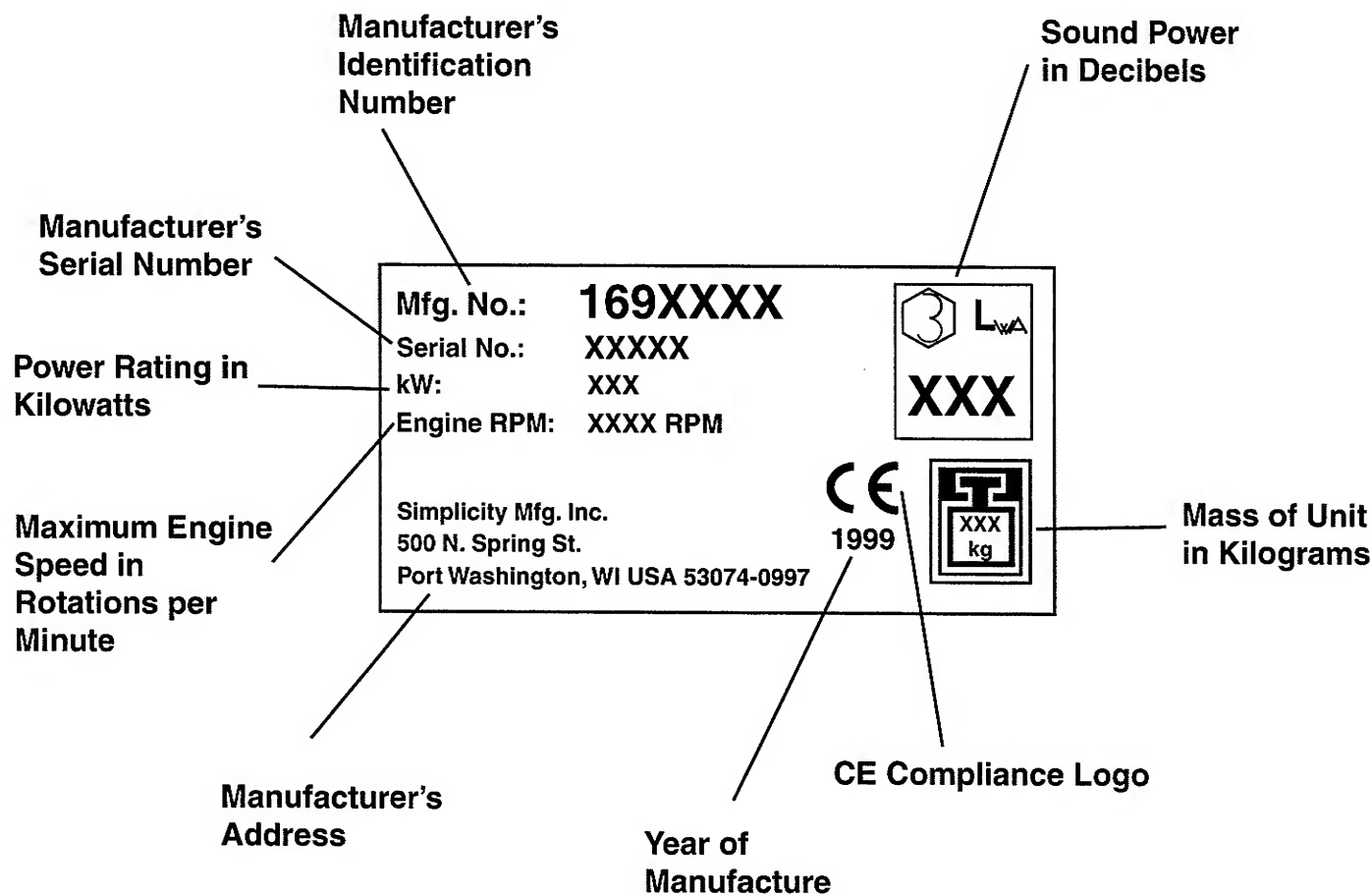
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**Card Expiration Date:** \_\_\_\_\_



**CE Identification Tag Information** \_\_\_\_\_

**CE IDENTIFICATION TAG MARKINGS**



**IDENTIFICATION TAG**

*Note: See I.D. tag on unit frame for serial number.*

*Export Models:  
Place copy of Identification  
Tag here.*











***Simplicity***

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